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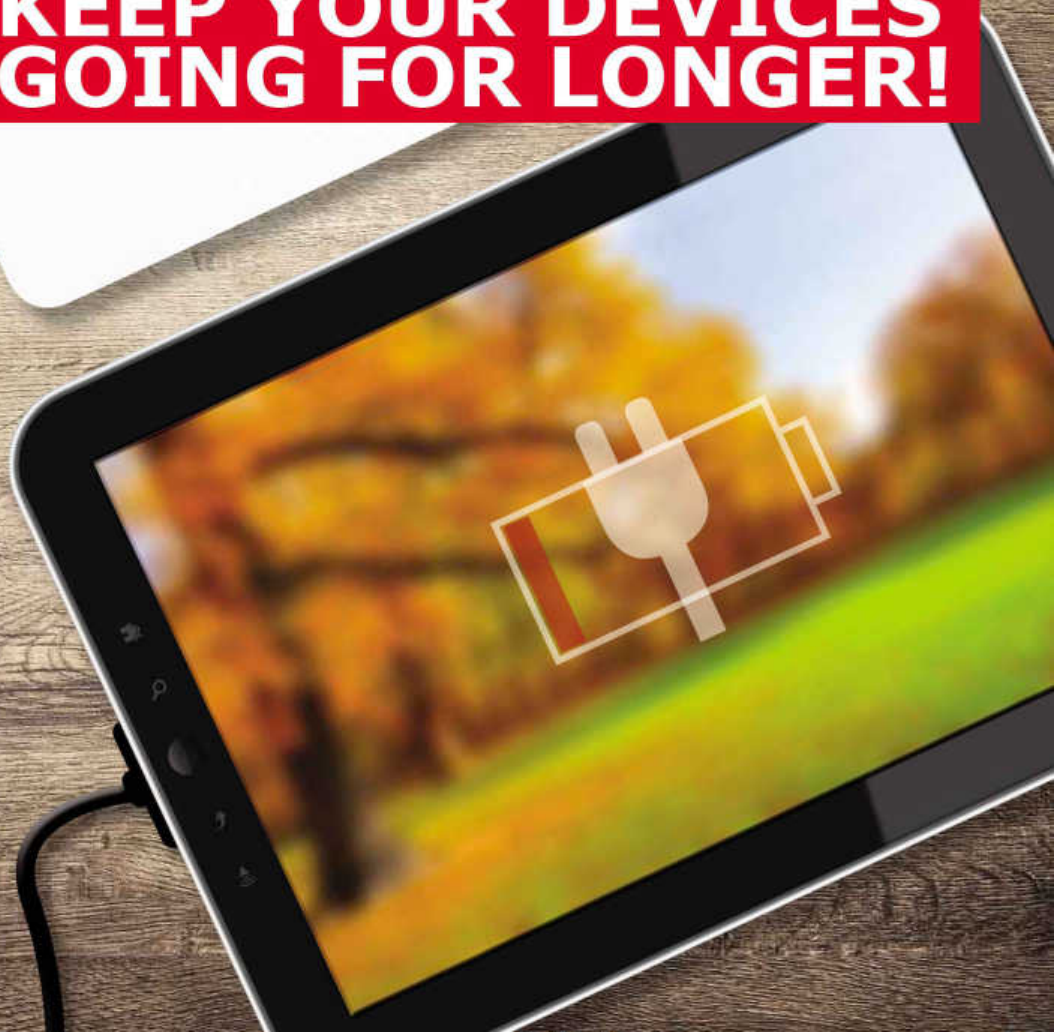
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- Could Wikipedia Really Be On Its Last Legs?
- The Raspberry Pi Alternatives That Can Run Windows
- What Does Microsoft's New Gaming Strategy Mean?

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08 Battery Saving

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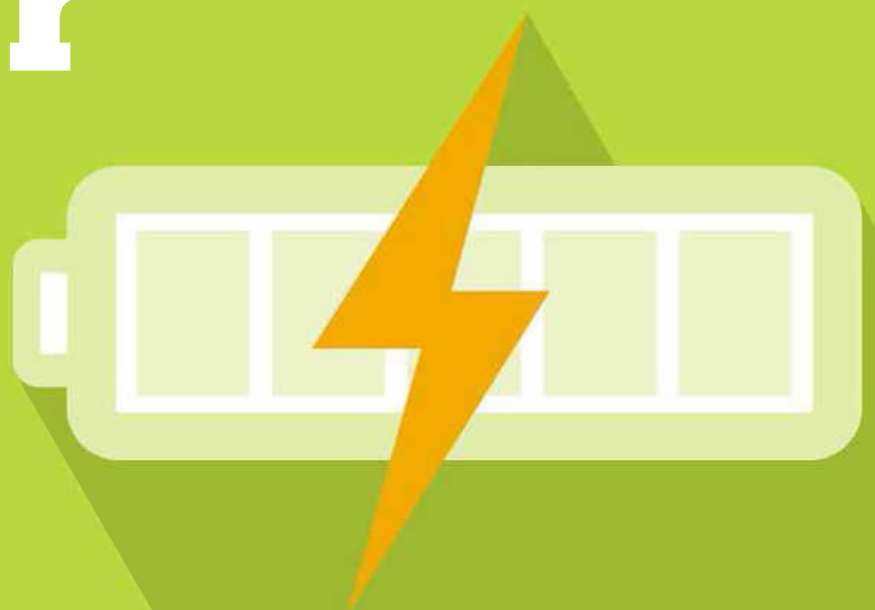
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How To Save Your Battery Power

Have you been in the middle of a task only for the screen to go black? **David Crookes** looks at how you can get more from your batteries



There is something rather unnerving about a low battery on a computer, tablet or phone, but does it prevent us tempting fate or engaging in some digital derring-do? Not in the slightest. Just like many of us would chance a drive to the shops on seemingly nothing more than the fumes of a petrol tank, when we see 3% on our device suddenly switching to two and then one, we still wonder whether we can just squeeze in that Wikipedia search before... oh, damn! Too late – and the charger's in the next room. Drat!

Regardless of the device you are using, conserving the power within the battery for as long as possible has become a fundamental part of life. Unfortunately that means, if you're anything like us, you'll grab your coat, put on your shoes, head for the door and only then notice that you really should have charged your phone much earlier.

The problem is our devices are more powerful than ever before and we're doing much more with them. We're watching movies, checking social media every five minutes and using them to pay for stuff at the till, yet we still expect our devices to go on for longer than a bottle of Fairy Liquid. It's just a good job there are some tricks you can use to squeeze out every last drop of power and prevent too much wastage. Let's have a gander at them.

Laptops

The first thing we'll look at are laptops, devices that have long had scientists seeking ways to engineer batteries with better staying power. Carting a power lead around isn't always desirable and sometimes you're stuck in locations where there is nowhere to plug it in anyway. So the first thing to do is consider using Windows' new Battery Saver mode.

Battery Saver works by placing the laptop into a lower performance setting when the battery life falls to less than 20%, but it can also be turned on manually. This is a good option if you want to conserve power before the laptop gets to the last throes of the current session's battery life.

You can do this by going to the Action Center in Windows 10, clicking All Settings > System and choosing Battery Saver. At the same time, you can tell Windows to automatically activate the battery saver at a higher or lower threshold (higher being better). Play around with these settings and then look at the section that shows the apps that eat up the most energy. Turn off any apps that you don't want running in the background.

Once you've changed those settings, you should then go back a step and select Power & Sleep. This will allow you to configure how long the laptop should stay active for before it takes a nap. Go

for the lowest setting you feel comfortable with and that way the laptop will sleep more frequently and so help save the battery from running down too fast.

Downscale Resolution

You may not realise it but using your laptop's display in a high resolution mode isn't healthy if you want the battery to last the day. If all you are doing is a bit of spreadsheeting or tapping out a report in a word processor, then taking the resolution down a notch will allow you to continue working for longer. While you're at it, turn the volume down too. It all helps.

Don't Multitask

The next thing is to be more single-minded. Having lots of windows and apps open is good for productivity but it can clutter up the screen and lead to greater strain on the processor. Whenever you can, try and keep things simple by having just one or two apps open at a time. You can make sure that unwanted apps and processes have been killed using the old trick of pressing Control, Alt and Delete and choosing Task Manager to close them, or by going to the Apple icon and selecting Force Quit on a Mac. You should find yourself able to work longer, but why not go even deeper?

Be More Efficient

Although you could type like fury and complete everything you need to do in record time, you may find it more relaxing to make your laptop more efficient instead. A good way of doing this is to defrag the drive so that any searches and processes are streamlined. You should then ensure the operating system is updated and replace any ageing parts (perhaps adding extra RAM). If you then remember that laptops are sensitive to heat and keep the lid open while you work, you should find your machine starts running to its optimum best again.

Don't Keep It Plugged In

Even so, whatever you do, don't keep it plugged in. According to Cadex Electronics CEO, Isidor Buchmann, a battery that is charged to 70% has 1,200 to 2,000 discharge cycles while one that is charged to 100% has just 300 to 500. This is because a higher charge percentage needs a cell to store more voltage and this, in turn, increases the stress that is put on the battery. To ease the burden, Buchmann advises not charging your laptop by more than 80% or letting it drop below 20%. That, however, is easier said than done.

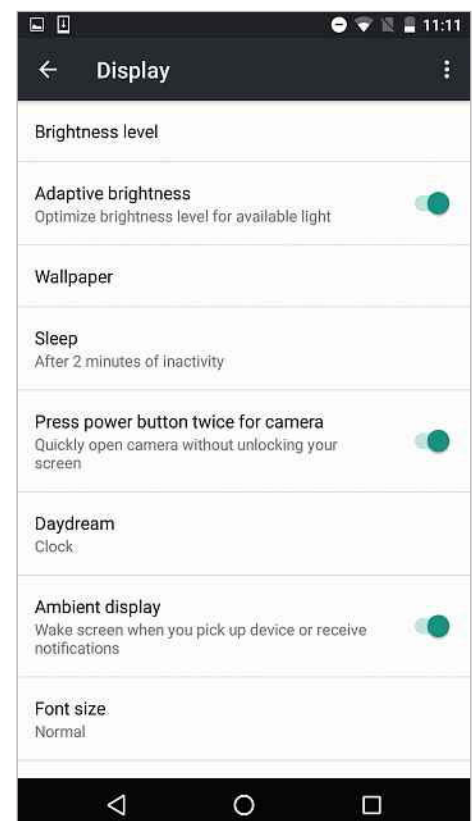
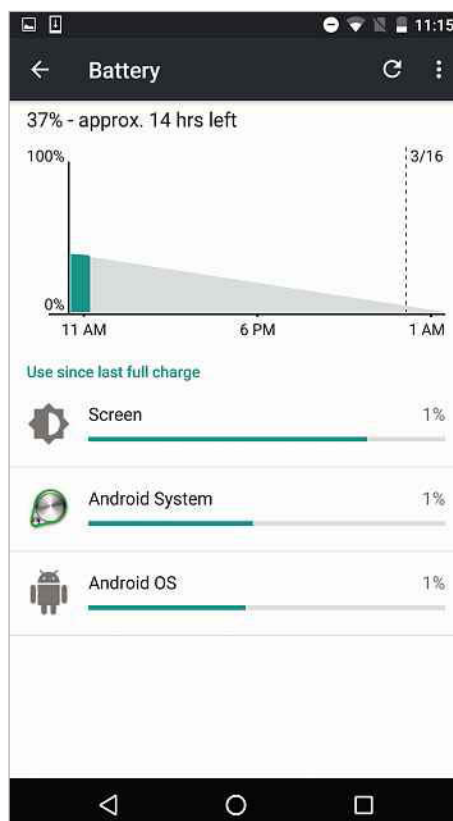
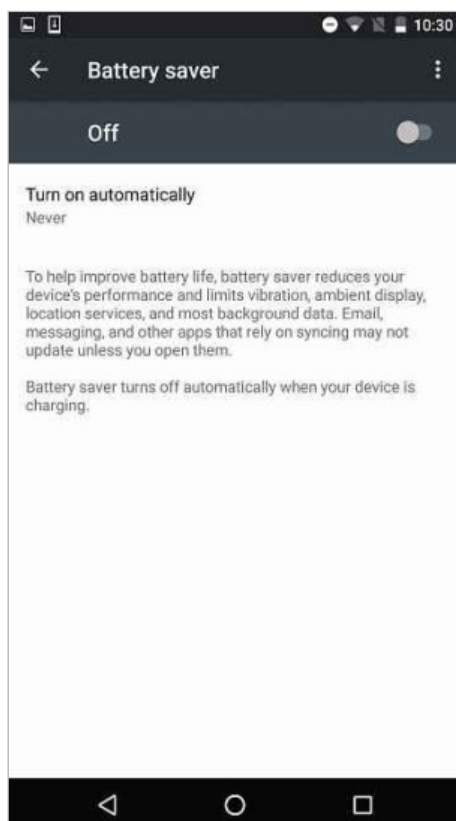
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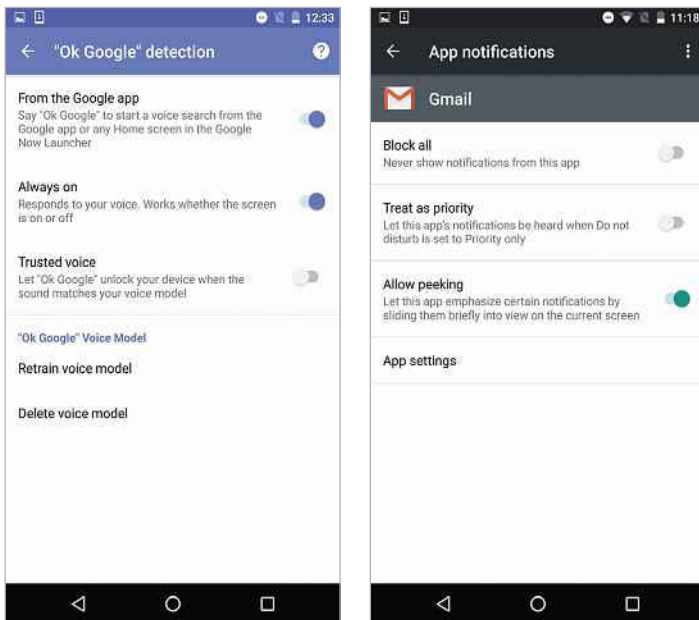
Android

So what of mobiles, arguably the battery-dependent devices that we use most these days? Well, a lot of the problems with these devices is that some of the apps we use eat up more battery life, data plan and phone storage than others. The key, then, is identifying which ones.

That's where the quarterly paper put out by AVG Technology comes in handy. Called the AVG Android App Performance Report, it analyses aggregated, anonymous data from more than a million AVG Android app users to see which mobile programs are the greatest offenders.

Topping the list are some of the most-loved apps around including Spotify, Facebook, BBC News, Netflix, Amazon Kindle, Snapchat,





Messenger and Instagram. “A number of unexpected apps such as these are consuming battery, storage, and data traffic without users’ knowledge – and, in many cases, for no good reason,” says Tony Anscombe, senior security evangelist of the company AVG Technologies. “So if you’re wondering why you’re not getting the best performance out of your device, this could well be why.”

Yet removing these apps from your Android device is bound to be counterproductive for most of us: these are useful, some would say essential, apps to have and by taking them off your device you’re only lessening the enjoyment of your tablet and phone. It’s lucky, then, that there are other ways of reducing the burden on your battery. While you should limit your use of the aforementioned apps when power is running low, here are some ways to stop the power from frittering away so quickly.

Check Battery Status

The Battery option in Settings shows you how much of your battery you have left and the amount of time that will equate to. It also shows you the apps and features that have been using your device since the last full charge. Not only does this give an at-a-glance view of the most hungry items, it also lets you tap on them and, in a lot of cases, view advice regarding the best ways of limiting their potential to eat away at your power.

What’s more, if you tap the menu on this page, you can call up the Battery saver. This is perfect for those moments when the battery is running low: it reduces performance and limits vibration, location services, ambient display and much of the background data.

Doze Away

If you have Marshmallow installed on your device, then you will automatically be able to make use of a feature called Doze which comes built into the latest operating system as standard. When the handset is completely still – that is, when it’s not in your pocket, being charged, or being touched in any way – it goes into a state of sleep.

The only thing that will wake it is a phone call or a text message or any other kind of high priority notification. It means you can set it down at night, sleep yourself and still benefit from a pretty much unchanged battery when you wake up. What about saving the battery life when you are doing something with your device, though?

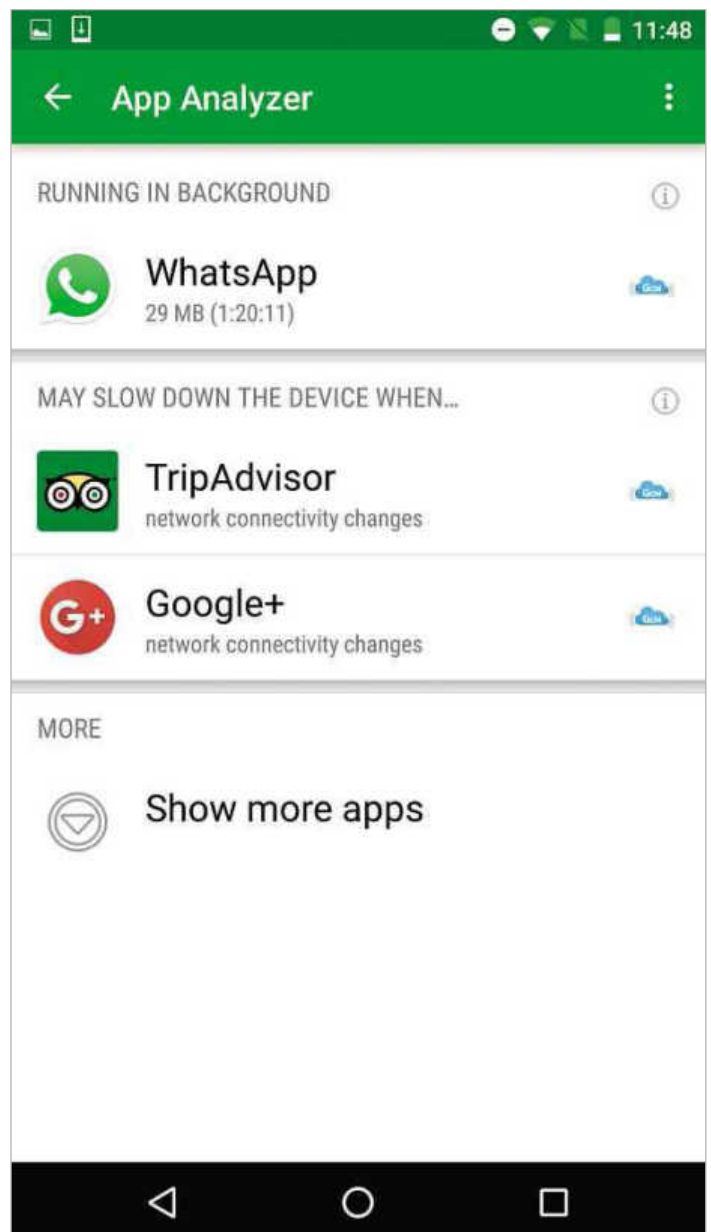
Activate Adaptive Brightness

Within Settings > Display is a feature called Adaptive Brightness that checks the available light and adjusts the screen accordingly. It’s better to have it turned on than off if you don’t want to play around with the brightness of the screen yourself. That said, tapping Brightness Level and determining how dim or otherwise you want the screen is the better solution. This way, the phone doesn’t need to keep checking the light and making its own adjustments. You can also set the brightness lower than the level at which the device tends to settle.

Prevent Notifications

By going to Settings > Apps, you can check key features such as social media and email to see how they are dealing with notifications. In Gmail, for instance, you are able to block notifications and turn off peeking. You should also close down any apps that are running in the background because they have an effect on battery power: tapping their names and selecting Force Stop will shut them down.

While we’re on the subject of apps, make sure that they are updated as well. It is often the case that developers look to ease the potential effects of their app on battery life in subsequent releases.





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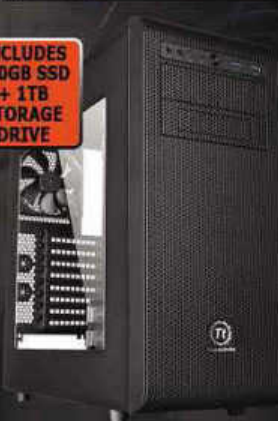
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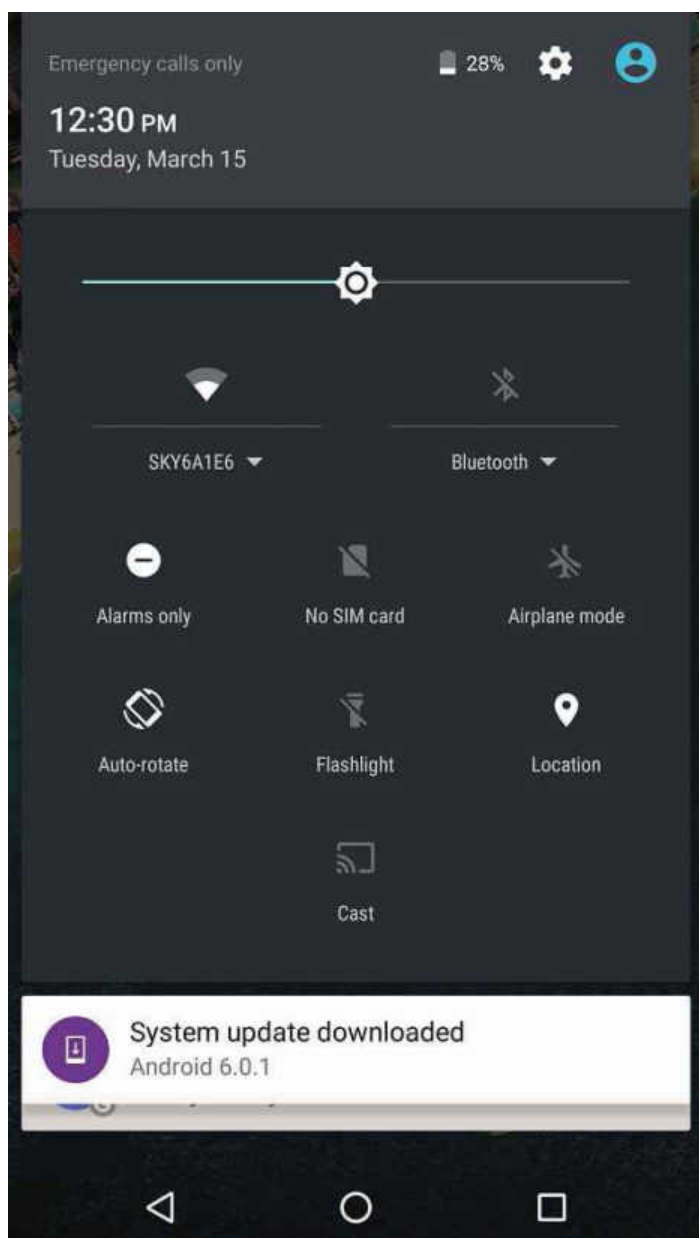


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Turn Off Vibrate

At first, tapping on the keyboard and feeling a buzz – the haptic feedback – feels like a nice touch, but it's unnecessary. To turn this off, go to Settings > Language & Input and scroll down until you see the heading for Keyboard & input methods. Tap on the keyboard you are using and select Preferences. You can now turn off Vibrate on Keypress.

Ditch Widgets And Wallpaper

Widgets are useful and live wallpaper is cool but they do eat up a lot of battery life – are they really that vital to your day-to-day use of your Android device? Go to Settings > Display > Wallpaper to remove the live wallpapers and send the widgets to the trash if you can live without them. Of course, do keep those that you want to keep hold of otherwise the Android experience may not be as enjoyable for you.

Download Greenify

Greenify is free and rolls in at just 3.43MB, but the control it gives you is priceless. It has been a top choice for a few years now, allowing you to spot misbehaving apps and put them into

hibernation when you're not using them. This prevents them from de-juicing the battery and forces them to be launched each time you want to use them.

It's a fantastic app that doesn't need you to root your phone (unless you want it to do everything for you silently in the background). By tapping the + button, you can see the apps running in the background, get a report on the apps that may slow down your device in certain circumstances and act upon them. Tailoring this to suit your needs is time well spent.

Go Into Lockdown

This next part is a double-header of advice. Having the screen turned on will drain the battery whereas allowing it to power down when it's not in use will save it. Although it's annoying having to keep waking a device, setting it so that the screen times out in as short a time as possible – maybe 30 seconds – will help enormously. Go to Settings > Display > Sleep to change this. At the same time, allow lock screen notifications – which you'll find under Settings > Sound & notification. Anything useful will pop up on the screen but you won't actually have to unlock the device and waste the battery to read it.

Update Apps Yourself

One of the issues with auto-updating apps is that they can take place at the same time and slow everything down while placing a massive load on your device. It's better to open up the Play Store and select the menu in the top-right to turn off Auto-update. You can then manually update the apps you use whenever you need to.

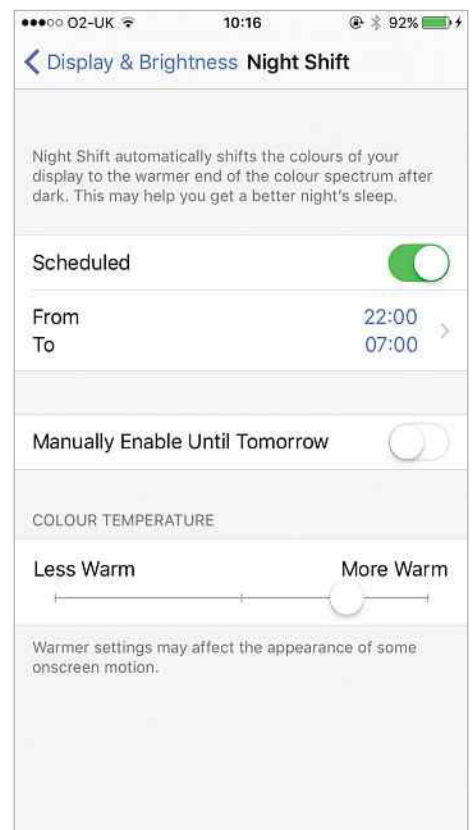
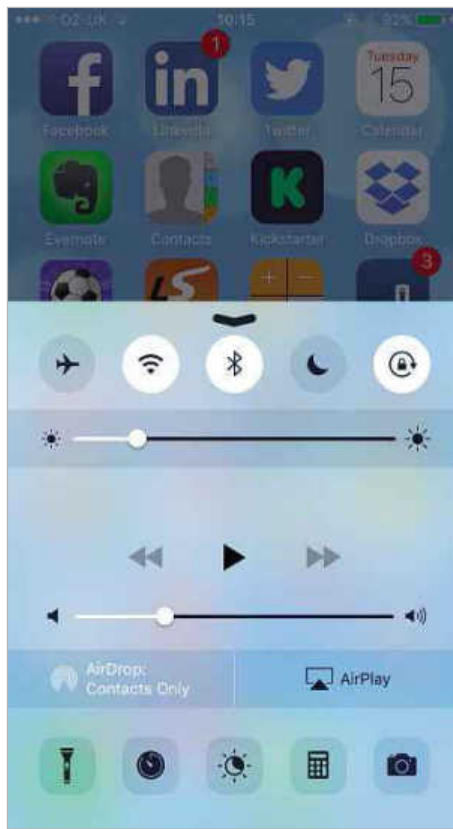
Only Use What You Need

Do you need GPS on? How about wi-fi at this very moment? Or Bluetooth? Keeping certain features active will drain the battery so

Save Batteries On A Kindle Fire

- 1 Turn off wi-fi and broadband under wireless settings
- 2 Be wary when using certain features: streaming or playing videos, music and games is power-hungry.
- 3 Look for the sleep function on your Kindle and set it to the lowest possible timespan
- 4 Turn the brightness down to as low as is comfortable
- 5 Make sure you exit all of your apps – check if any are still running and delete unwanted ones.





pull down the control centre, tap the top of the screen and tap the icons to toggle them on and off.

One other thing to consider is whether you want the OK Google service on all of the time – doing so will make it constantly listen out for your voice. You can turn this off by going to the Google app, hitting the menu and selecting Settings. Tap Voice > “Ok Google” Detection and turn Always On to Off.

Apple iOS

And so we come to iOS but before we look at how you can save battery life on Apple's devices, it is time to dispel a myth. For once upon a time, it was commonly thought that having lots of iPhone and iPad apps open at once zapped the device's battery life. But when one concerned user took the matter straight to the top and emailed Apple's chief executive Tim Cook, the answer was perhaps surprising. “Hey Tim,” Apple owner Caleb began. “Do you quit your iOS multitasking apps frequently and is this necessary for battery life? Just wanting you to put this controversy to rest!”

The email was passed on to Apple's head of software Craig Federighi. “No and No,” he replied, adding a smiley face for good measure and thanking the writer for being an Apple customer. The reason – which he didn't explain – is that apps are frozen in RAM when they are not in use unless they're actually meant to be performing a background task such as navigating or playing back music. For that reason, Apple does recommend disabling apps from carrying out background refreshes.

That's not to say that you can't save battery life via other means. According to the Cupertino-based giant, you should be keeping your iOS device up-to-date (“Apple software updates often include advanced energy-saving technologies,” it says). You should also avoid exposing an iOS device to extreme temperatures (ambient temperatures higher than 35C (95F) are said to cause permanent damage to the battery capacity).

Apple also gives a couple of other useful battery-saving tips, saying you should remove cases that feel hot to the touch when you're charging them and juice-up iPhones and iPads to around 50% if you're about to put them into storage for any long period of time. Anything much lower or higher will cause the device to either lose the ability to hold a charge or reduce the battery life. Yet that's only the tip of the iceberg...

Check Out Your Apps

Aside from allowing your phone to auto-lock more quickly when it's not in use by going to General > Auto-Lock and setting it as low as 30 seconds, you should head to the Settings > Battery page. It has a button that lets you turn Battery Percentage on and off and by activating it you can see exactly how much power is left without relying on interpreting a tiny graphic.

This page also shows a list of apps you have used over both the last 24 hours and the past seven days together with a percentage of the battery power each one has used. Facebook tends to top this list so, if you have little power on your phone, checking this app to see what someone is having for lunch may not be such a good idea.

Use Low Power Mode

In fact, you do need to alter your behaviour whenever your iDevice's battery begins to run down. When it reaches 20%, your phone or tablet will prompt you to activate the Low Power Mode, but you can activate it whenever you want by going to Settings > Battery.

This feature is very useful if you know you are going to be out and about for a long time without access to a power point, but it does mean you won't be able to use mail fetch, background app refresh, automatic downloads or some visual effects. The display will also power off more quickly, your screen will dim and it will perform slightly slower.

Lower The Brightness

One of the biggest battery drains is the screen, and having it turned up so full that it could potentially be seen from the moon, will quickly eat into the energy supply. There are a couple of ways to lower this. You could open the Settings app, navigate to Display & Brightness and move the slider in the brightness section to the left (you can also tap Auto-Brightness so that your device checks your external lighting conditions and makes appropriate adjustments to the screen for you). Alternatively, swipe up from the bottom of the screen to show the control centre and then move the slider in the brightness section to the left. This is far quicker.

Make Use Of Night Shift

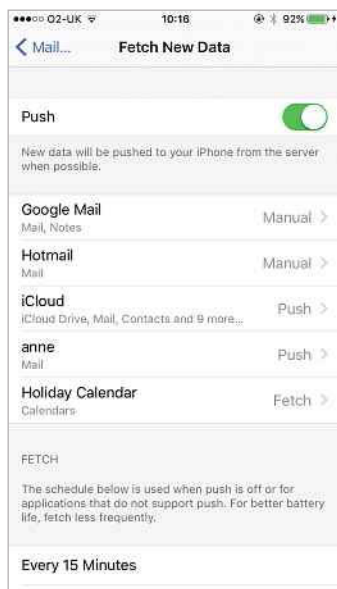
While you have the Control Center open, check out one of the newest additions within iOS 9.3, something called Night Shift. Turning this on cuts down on the blue light exposure of the screen so that instead of showing bright white, it displays a warmer yellow. It is supposed to be easier on your eyes and, more importantly, your circadian rhythm, which means you don't have to worry that checking your emails just before you hit the sack is going to keep your brain alert all night (blue wavelengths wake us up so eliminating them help us to sleep better).

One of the interesting things about this is that the function is disabled in low power mode so it could well be – and we haven't exhaustively tested this – that the use of Night Shift uses up more battery and needs that extra power. If that's the case, you may want to disable it if your device needs charging as the evening draws in.

Use Wi-fi Smartly

Staying with the Control Center, you will see an icon for wi-fi. The official Apple advice is to keep wi-fi on at all times, but if you are in an area where you know you're not going to pick up a connection, then having it activated will only cause the phone to unnecessarily search for a signal.

You can turn it off with a single tap, but do remember to switch it back on when you're in an area that does have wi-fi you want to use. That's because a wi-fi connection is less power-hungry than a mobile one. As an aside to this, if you're on your travels and you have a low signal or no mobile coverage, swipe up on the screen and select Airplane mode. You won't be able to make or receive calls – but then with a poor signal you wouldn't be able to anyway.



Windows Phone

Many of the tips for iOS and Android apply with Windows Phone. It's certainly worth checking out the Battery Saver: Microsoft reckons it can give you an extra 24 hours use.

Step 1

Like with iOS, the Battery Saver kicks in when the power goes below 20%, but you can manually alter this so that it is always on. The screen tells you how much battery life remains, the time you have left and there are options to turn it off, activate it when the battery is under 20% or have it on all the time.



Step 2

You can also click on individual apps and see how much battery they take up. You can turn off the ability to have apps running in the background if you wish and there is an option for background running even when Battery Saver is on (but it's not recommended).



Alter Some App Settings

If you want some extra peace and quiet and save the battery in the process, then consider whether you really need to know exactly when each and every email is received? By going to Settings > Mail, Contacts, Calendar > Fetch New Data you are able turn push notifications off. Leaving it on puts a strain on your battery.

You should also check Settings > Notifications and turn off any apps which like to notify you of particular happenings. Just decide which ones are necessary – you'll probably find very few of them actually are. While you are in Settings, go to General > Background App Refresh and turn off any which you don't want to be refreshing content whenever it detects wi-fi or a mobile network. Apple says itself on this page that turning them off can help to preserve battery life.

Turn Off Location Services

Finally, allowing apps to determine your location is necessary in some circumstances – such as when you are using a map – but not in so many others. Having them pinpoint your position drains the battery so go to Settings > Privacy > Location Services and turn off any of the apps that you would rather not make use of your location. You can also, if you wish, turn them all off by toggling the main slider on this page. [mm](#)



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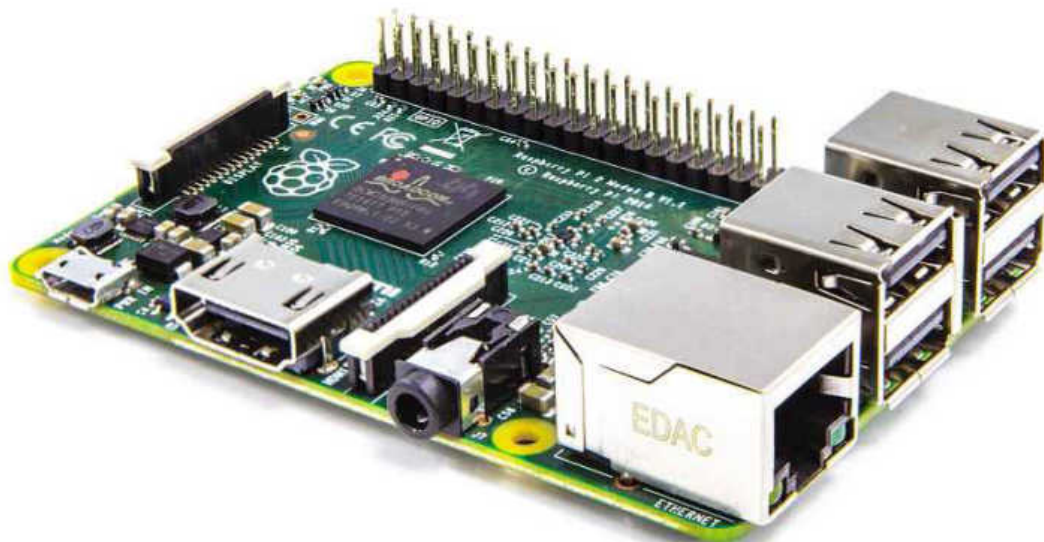
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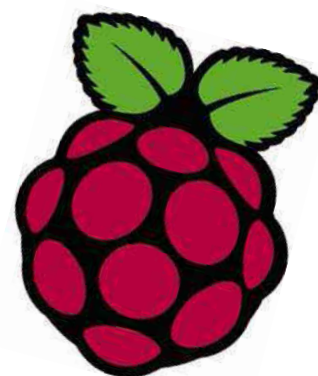
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X86 Alternatives To The Raspberry Pi



We look at what other low-powered computers are available right now

Older readers will no doubt remember IT classes in school back in the day. Long before we had PCs and any sort of decent equipment, there was the BBC Micro and the Acorn. Classes consisted of pretty basic stuff, with nothing too adventurous. Any kids with even a passing knowledge of computing were quickly bored, often knowing more about the subject than the teacher. Yes, not a great deal was learned by those already interested in computers, but it was a start.

How far we've come since then. Schools now have decent PCs, the internet, proper programming lessons and much more. Even better, they now have access to the Raspberry Pi.

Quickly becoming a very popular hobbyist piece of kit, the Raspberry Pi, a low-powered computer that's about the size of a credit card, started out life as an educational tool. Initially designed to teach computer science and programming in school, allowing mass exposure for little cost, it was a clever project that grew in popularity very quickly. The Raspberry Pi units were very cheap and simple enough for anyone to get their start in the subject. It's been so effective, it's even heralded as the BBC Micro 2.0 by various parties.

The official units themselves include an ARM CPU, VideoCore GPU, 512MB-1GB RAM, SDHC slot, and a couple of USB ports.

Units usually run a variation of Linux, such as Raspbian, or alternatives like FreeBSD, RISC OS and AROS. The CPU's speed was originally around 700MHz. Newer variations of the Pi have, of course, improved on this, with multi-core CPUs and more powerful components, but it's always designed to be a low-power, cheap system for education.

This limitation hasn't stopped users from turning the Raspberry Pi into more than a simple educational tool, though, and it's been used for a range of purposes. The Pi can be overclocked, which is one of the lessons you can teach with it, and this opens up some new possibilities. Earlier incarnations like the model A and A+ had no built-in networking but could be modded to function on a network (later versions have networking, including wi-fi), and the GPU is more flexible than you may think. This gives this tiny unit a lot of potential for such a cheap and low-end system.

Basically, it's far more than an educational tool, and it's been picked up by home computing enthusiasts who wish to experiment with the device to create various projects. People have created retro gaming consoles, Tor routers, music players, digital picture frames and even media servers. It's a diverse community and one that's always experimenting.

With such promise behind it, why hasn't anyone else come up with such a device? The Pi has made it big in education and now has a following of enthusiasts. Surely there's room for more than one such platform, right? Of course there is, and that's what we're here to look at. There are a range of alternatives to the Raspberry Pi, with similar mini-systems designed for various tasks, so if you want to experiment with other devices, we've got what you need here.

“ The overall capabilities of the Minnowboard are impressive, and for many, it's by far the superior option ”

We'll be focusing on the x86 alternatives to the ARM-based Pi here, but there are other options too, so don't be afraid to experiment if neither of these architectures are to your taste.

ARMless

One of the major selling points of the Raspberry Pi is the low cost. Currently, a Raspberry Pi 3 Model B will set you back a mere £35. Regardless of computing power, that's not much at all for a computer, and the Pi can do quite a lot for such a low price.

When it comes to x86 architecture, which we see used with Intel CPUs, the price is usually an issue. These systems cost

more – sometimes a lot more. A Minnowboard, for example, which is a popular x86 alternative we'll look at later, can cost around £200-350. That's quite the price hike, and while it houses a more powerful CPU, that's a lot to ask compared to the Raspberry Pi.

The higher cost is for the extra power and functionality, and these systems can usually run Windows or Windows Server. They're also more flexible in terms of what can be done with regard to network and data I/O, as well as services.

To give you a simple overview of the difference between the Raspberry Pi and the x86 alternatives, check out the tables below. First up are the variants of the Raspberry Pi, then there are some of the x86 variants.

You can clearly see that a lot of the basic specifications are similar, with the main difference being the choice of hardware, but the actual numbers are close. The CPU is the main difference, of course, and the GPU used is another. In terms of RAM and CPU frequency, both x86 and ARM options have versions that closely match.

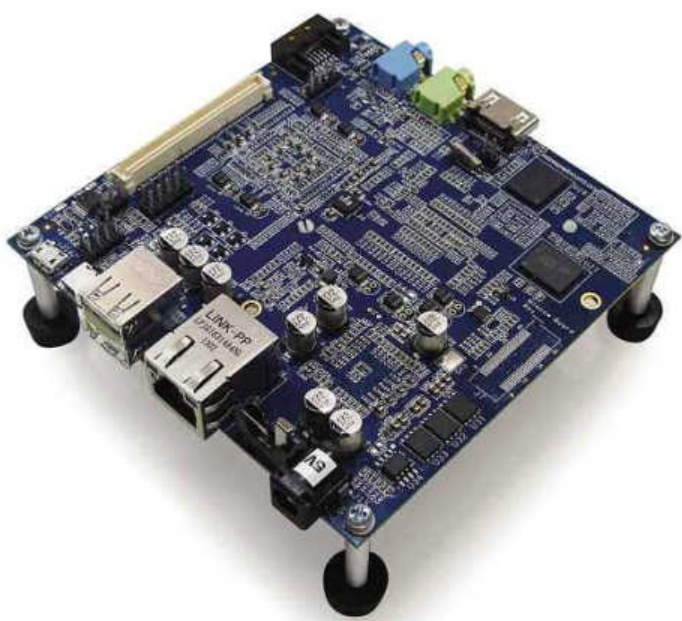
Earlier versions of the Raspberry Pi offer less power than most of the x86 options, but the more recent versions address this, featuring quad-core CPUs and offering higher speeds. Where the Pi always comes off worse, however, is the GPU, which hasn't really changed. Compared to x86 options, some of which offer much better models like ATI's Radeon, there's a clear division. Let's look at these x86 alternatives more closely.

Open Atom

Surely a candidate for the most popular Raspberry Pi alternative, Intel's open-source Minnowboard is a great hobbyist mini board system. Unlike the Pi, the Minnowboard isn't so much a

Raspberry Pi boards					
Model	CPU	CPU	CPU Cores	CPU Frequency	GPU
Raspberry Pi Model A / B rev 1	Broadcom BCM2835	Broadcom BCM2835	1	700 MHz	Broadcom VideoCore IV
Raspberry Pi Model B rev 2 / B+	Broadcom BCM2835	Broadcom BCM2835	1	700 MHz	Broadcom VideoCore IV
Raspberry Pi Zero	Broadcom BCM2835	Broadcom BCM2835	1	1 GHz	Broadcom VideoCore IV
Raspberry Pi 2 Model B	Broadcom BCM2836	Broadcom BCM2836	4	900 MHz	Broadcom VideoCore IV
Raspberry Pi 3 Model B	Broadcom BCM2837	Broadcom BCM2837	4	1.2 GHz	Broadcom VideoCore IV

x86 boards					
Model	CPU	Architecture	CPU Cores	CPU Frequency	GPU
MinnowBoard	Intel Atom E640	x86 Bonnell	1	1 GHz	Intel GMA600
Intel Galileo Gen 2	Intel Quark SoC X1000	x86 Quark	1	400 MHz	N/A
Supermicro E100-8Q	Intel® Quark™ SoC X1021	x86 Quark	1	400 MHz	N/A
Intel NUC Board DE3815TYBE	Intel Atom E3815	x86-64 Bay Trail-I	1	1.46 GHz	Intel HD Graphics
Foxconn AT-5570	AMD C-70 APU	x86-64 Bobcat	2	1-1.33 GHz	Radeon HD 7290
Gizmo Board	AMD Embedded G-Series T40E APU	x86-64 Bobcat	2	1 GHz	Radeon HD 6250
PC Engines APU.1C	AMD Embedded G-Series T40E APU	x86-64 Bobcat	2	1 GHz	N/A (disabled in BIOS)
PC Engines APU.1D4	AMD Embedded G-Series T40E APU	x86-64 Bobcat	2	1 GHz	N/A (disabled in BIOS)
VIA EPIA P910	VIA Nano QuadCore L4650E	x86-64 Nano	4	1 GHz	VIA Chrome 640

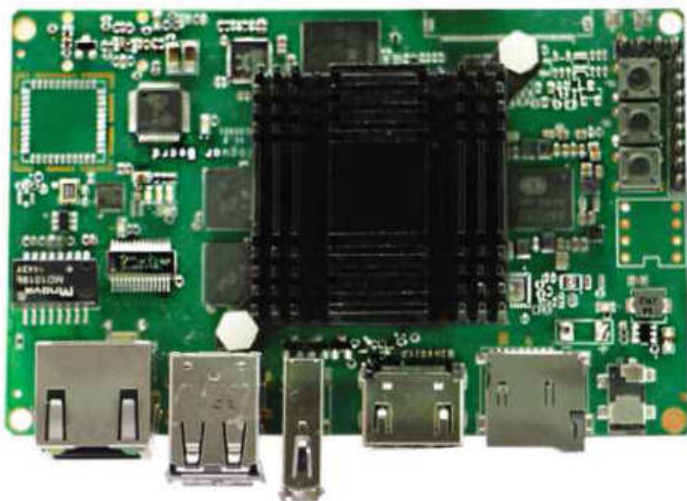


▲ Intel's Minnowboard is one of the most popular x86 Pi alternatives

cheap-as-chips system, but is instead intended to be more of a bare-bones mini-ITX device. To this end, the board features an Intel Atom (64-bit), usually with on-board graphics, DDR2 RAM, Gigabit Ethernet, PCI Express and SATA-2.

A big difference here is the expansion capability of the Minnowboard. Using special cards called Lures, the system can be grown, and this only adds to the potential of the hobbyist model, with lures that can be customised by users as part of a computing project. The benefit of the x86 architecture gives users the industry standard features to work with and support for all major operating systems, including Windows.

The overall capabilities of the Minnowboard are impressive, and for many, it's by far the superior option, but as we mentioned, it comes at a price, one that's far higher than the Raspberry Pi, and this is the rub with most x86 options. A big reason the Pi has been so successful is the price, especially for those who want to buy in bulk, such as schools. For this reason, the Minnowboard remains more of an option for the lone hobbyist in the home, and educational use isn't as widespread.



▲ The Jaguarboard is a Kickstarter-funded project

Not all x86 options are expensive, though. Take the Jaguarboard for example. This Kickstarter-funded product is an x86 single-board system that costs only around \$80. It's still a bit more expensive than the Raspberry Pi, but it's far less than the Minnowboard.

It features an Intel Atom 1.33GHz CPU (overclocked it can reach 1.83GHz), 1GB RAM and 16GB local eMMC storage. There's built-in LAN, USB 2.0, HDMI 1.4, two COM ports, SDIO and four GPIO pins.

It's quite the handy little system and offers plenty of power, with the benefit of the x86 architecture. The cost is far more approachable in terms of the single-board market, and it's possibly a better option for those considering the Minnowboard, but who find the cost a little high.

“ The Gizmo 2 costs around £300, and the first model isn't much cheaper ”

Lastly, we have the Gizmo Board 2. Like the Minnowboard, this is a more powerful single-board system, except this falls on AMD's side of the tracks, featuring a dual-core 1GHz AMD GX210HA CPU and 1GB RAM. Connectivity includes HDMI, USB 2.0, Ethernet and a couple of custom I/O connectors. There's also a micro-SD slot and mSATA. The design of the board mimics the architecture used in modern games consoles that blend CPU and GPU workload.

The older Gizmo 1 has similar specifications, save for less power, with an older AMD CPU and embedded Radeon G-Series GPU. However, it has a nice extra feature. Accompanying the Gizmo 1 is an add-on board, the Explorer. This is a special device that includes a keypad and LCD designed for testing and prototyping – a major boon for any hobbyist tinkerer.

Both boards are great tools, but sadly they also cost a lot more than the Raspberry Pi. The Gizmo 2 costs around £300, and the first model isn't much cheaper. Like the Minnowboard, however, the Gizmo does offer more power than the Pi.



▲ The Gizmo 2 is a good alternative to the Raspberry Pi

cocktail Audio



Cocktail Audio Pro X100

High Resolution Digital Streamer, NAS and Ripper with DSD/DXD Playback. The latest X100 model merges CD ripping, Network Attached Storage (NAS) and multimedia streaming with an open platform. Pro X100 is compatible with most audio devices and delivers hi end audio and DSD music with an outstanding flawless output. Supports upto 8TB HDD. Some features are as below

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- Category options on playback media control
- Control with any smartphone, tablet or PC
- Additional tools to playback on controllers
- Cocktail Audio Pro (X100) can be customised
- Intel T-D Quad Core CPU 2.0Ghz
- Music library mirroring option
- USB Audio interface (asynchronous output)
- Private cloud based online music metadata service
- Share files via streaming protocols like SMB, NFS, UPNP, Airplay, DLNA ...
- Indexes through Squeezebox Server integration
- Media server for video, audio and picture streaming
- Power efficient



Cocktail Audio Mini X9

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- » Supports devices on iOS, Android, Win ...any wireless device.
- » Supports Network/PC Streaming
- » Free optional stream via 'WI-FI Music' App & other compatible Apps
- » Easy pair from network to Bluetooth or physical connection (AUX)



▲ Intel's Compute Stick is a full system crammed into a small container

Keeping Up

In terms of power and possibilities, it's clear that the x86 alternatives to the Raspberry Pi are superior, and although the Pi is still the de facto leader in the single-board market, it's hard to deny this is heavily down to the price. Sure, there are also other concerns, such as ease of use, accessibility and use in education – areas where the Pi arguably wins out – but if the x86 models had a similar price, would this still be the case, or would the public prefer the added power over simplicity? We suspect x86 would take over. Not only does more power deliver more options, but like it or not, x86 is

the dominating architecture, so any educational content using it instantly delivers a more relevant experience. It's always good to learn about other architectures and technologies, of course, but knowing the ins and outs of the most popular is also important.

The crowdfunded Jaguarboard is a clear example of how it's possible to ship an x86 alternative at a lower cost, and although it's not as powerful as the Minnow and Gizmo, it's still very attractive in terms of flexibility, and many would argue it's better than the Pi, making it a perfectly viable option.

With price so important and projects like the Jaguarboard proving the possibility of shipping a cheaper x86 model, for the architecture to really take off in the single-board market, the price needs to drop – pure and simple. People clearly prefer a cheaper base cost over power if a choice has to be made, and when it comes to these hobbyist boards and for large user bases like education to embrace the x86 option, it's even more essential the price becomes more reasonable.

Vendors with a stake, such as Intel and AMD need to address this, as those studying computer science are the next generation of developers, and the more experience they have with x86, the better the architecture's future is. With ARM's growth in the mobile market, a market that's exploded over the years, this is even more important, and x86 needs to make more inroads into the small-scale device arena. [mm](#)

Pi Fillings

If you're reading this and wondering what you can actually do with a Raspberry Pi, or one of the x86 alternatives, here are just a few examples of the kinds of project people have created using the single-board system.

First we have a simple one, and a project made possible by official support. *Minecraft* is a true phenomenon of a game, entering pop culture in a major way. It's been ported to many different platforms since its debut on PC and even has a dedicated version for the Raspberry Pi, unsurprisingly called *Minecraft: Pi Edition*. Fans of the game have used the Raspberry Pi to create a dedicated *Minecraft* system, with the only use of the board being to play *Minecraft*. It's great for kids who are getting to grips with gaming, and *Minecraft* is one of the best games in terms of educational content, teaching so many things, from general hand-eye coordination and creativity to basic nature and even electrical circuitry.

One Pi user, Terance Eden, took the Pi to a different gaming level by turning it into a retro gaming system. The Raspberry Pi was housed inside an original Xbox controller, and with the system loaded up with the RetroPie emulation program, it functioned as a stand-alone emulation console, using the Xbox pad as the controller. Nice.

More technical uses include the creation of a dedicated Tor router. This project uses the Pi to create a specialised

router that sends all of your traffic through the encrypted Tor network, favoured by users who value their privacy.

Of course, not all single-board system uses are so niche. As they're actually full systems, they can be turned into standard setups too, such as a home media server, music player or a simple low-end system solely for social media or chat. All that's needed is a basic knowledge of PC and software installations, and a little bit of elbow grease.



▲ A PC, emulator and game controller, all in one unit

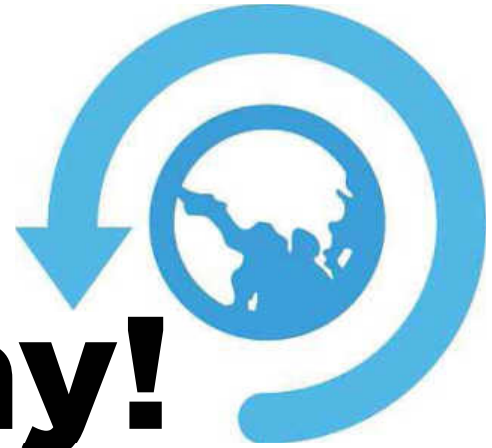


▲ The Raspberry Pi can be turned into an ultra private Tor router



▲ There's a version of Minecraft specially created for the Raspberry Pi

It's World Backup Day!



March 31st is the date, and an expert in the field is here to share his thoughts on why backing up is so important...

On 31st March, it's World Backup Day. On this date, the people behind www.worldbackupday.com want you to back up your files. Of course, creating backups isn't just for World Backup Day, but there's more to this than that. As the site says, "it's also a day to talk about the enormous task of preserving our increasingly digital heritage and cultural works for future generations."

Yes, it's all about awareness, reaching out to those who've never created a backup, as well as providing a useful reminder to those of us who really should know better.

Someone who definitely does know better is John Michael, CEO of iStorage. His company is a leading producer of PIN protected, hardware-encrypted data storage

devices. USB flash drives, hard drives, SSDs – you name it, they're all available from iStorage. He's also been inventing backup hardware for decades, so it's safe to say he knows what he's talking about when it comes to backing up.

He shared his thoughts with us regarding the importance of backing up for businesses of all sizes. And even if you don't own a business, his advice is still worth bearing in mind...

Over To You, Mr Michael

"Backing up important company data is an essential ongoing process that organisations of all sizes must invest resources in. The cost and risks to the future success of the business can be far reaching. Whilst it is



why iStorage supports the initiative, is that the EU will soon have the power to fine companies 20 million or 4% of their annual turnover if they are found to be in breach of the soon to be General Data Protection Regulation. This regulation enforces any business that holds data on EU citizens to implement adequate security measures to protect data from loss or theft.

"Encryption is the best form of security, rendering the data unintelligible to any unauthorised access, GDPR also promotes encryption as an essential tool for backing up data. As such, it is going to become more important than ever before for companies to ensure that they are taking adequate steps to protect their sensitive and business-critical data."

John Michael
CEO, iStorage

“The best practice approach for data security that is widely recommended is three data backups at any one time”



▲ John Michael, CEO of iStorage

now commonplace for businesses to have disaster recovery strategy in place to prevent against the loss of business-critical data, industry figures suggest that only one in ten businesses actually back up (goo.gl/Dd13pZ). The lack of backups can expose the business to data breaches, amongst other threats.

"In today's fast-paced business environment, backing up using encryption should be a core policy for businesses of any size. The best practice approach for data security that is widely recommended is three data backups at any one time: two copies of the data kept on-site on encrypted devices, with a further copy kept as a secure backup off-site in a trusted location.

"One of the reasons why World Backup Day is so important, and a key reason as to



▲ The datAshur, from iStorage – great for home users and businesses alike

Microsoft's Gaming Strategy: Good Or Bad?

Microsoft has announced big plans to change the gaming industry, giving the Redmond giant huge control, and people are unsure. What's it all about?

If you're a PC gamer, you've probably already stumbled on something called Universal Windows Platform (UWP). Introduced with Windows 10, this is a new application architecture that Microsoft has developed to allow seamless development of applications so they can run on both Windows and Windows Mobile, with no need to write separate apps for each platform. This universal approach is intended to make it easier for both developers and gamers, and it falls in line with Microsoft's constant goal of unifying all devices across the Windows OS brand.

This all sounds fine on the surface, but recently there have been many rumours and criticisms of Microsoft's strategy. Some industry big hitters have come out and struck directly at Microsoft, accusing the company of unfairly attempting to monopolise the market and restrain software developers, publishers and sellers. It's confusing, but let's take a look at what this is all about.

Epic Claims

The subject of Microsoft's UWP and possible move to dominate the gaming market was arguably no better thrust into the limelight than with the publishing of an article on the *Guardian's* website (bit.ly/24G0egY). This was written by Epic Games CEO Tim Sweeny, and in it he was damning of Microsoft's tactics.

"Microsoft is moving against the entire PC industry – including consumers (and gamers in particular), software developers such as

Epic Games, publishers like EA and Activision, and distributors like Valve and Good Old Games," he said of the plans for the UWP.

"Microsoft has launched new PC Windows features exclusively in UWP and is effectively telling developers you can use these Windows features only if you submit to the control of our locked-down UWP ecosystem."

Of course, we haven't explained exactly what Microsoft is planning yet, so Sweeny's comments may seem a little out of context, but this is how many people became aware of Microsoft's plans, so we began in this way to highlight the seemingly sinister moves by Microsoft and the possible hyperbolic statements made by those who are against the plans for UWP. We need to study exactly what Microsoft wants to achieve before we decide if this is a good or, as many believe, bad thing.

Windows Shopping

With UWP, Microsoft's attempt to unify game development across Windows and Windows Mobile makes sense, as it eliminates the need to recode or develop specifically for different platforms. If left here, few would have any complaints. The worries have arisen due to other rumours and different statements from Microsoft about other areas, most notably the Windows Store and Microsoft's more recent announcement of wanting true cross-platform support, even with competing devices like Sony's PS4, which is soundly beating Microsoft's own Xbox One in sales.

MICROSOFT'S GAMING STRATEGY



▲ **UWP is one of Microsoft's key technologies, but it's being met with a lot of criticism**

The Windows Store operates just like other software platforms like Apple's App Store, Valve's Steam and others such as EA's Origin and GOG.com. Essentially, it's a storefront Microsoft uses to sell apps digitally to customers. With UWP paired with this store, it's feared that Microsoft would eventually develop far too much control.

A point Sweeney focuses on is the use of UWP and its apparent closed-off nature. Simply put, if a developer wants to create software for the system or systems using the UWP architecture, they have to abide by the rules and regulations Microsoft lays out, and the software is distributed through the Windows Store – nowhere else.

This would essentially mean Microsoft cuts off all competition, including Steam and other big names, and even the software developers themselves wouldn't be able to sell their own products. This, of course, also means that for every sale, Microsoft takes its cut and it guarantees support for Microsoft platforms, even possible exclusivity.

Xbox head Phil Spencer disputed Sweeney's claims via Twitter, saying "Windows has always been an open ecosystem welcoming the contributions of hardware and software partners and will always continue to be." He also said more information about the future of UWP would be revealed soon.

With Microsoft's recent move to try to put cross-platform support in place, would this mean the company would also earn money from software sales to competing platforms? It's hard to say, but what's clear is the worry many in the industry have that Microsoft is heading for another instance of possible monopolistic business, which government bodies have already had to step in and put a stop to, most notably Internet Explorer's domination of the market when packaged with Windows.

It's early days, so any insights people may have is purely conjecture, but it's clear that the plans in place are not winning over a lot of people, and as with many tall tales, there's usually some form of truth there. Let's face it, Microsoft isn't a company to shy away from risky strategies, even when they come back and bite it in the behind.

Surely there's more to people's complaints than a few concerns, right? Well, yes, and these are problems already seen and inherent with the design of both UWP and the Windows Store.

Limited Platform

PC gamers have already compared UWP and the Windows Store implementation to another much-hated Microsoft endeavour: the ill-fated Games For Windows Live (GFWL). This now defunct system was notorious for placing limitations on both gamers and developers and caused all sorts of problems for gamers, including connection faults, crashes, awful copy protection and much more. It was universally loathed, so it was killed off after a fairly short lifespan, with developers having to revisit older titles to make them playable without the GFWL framework being present – something games needed during the service's tenure.

GFWL failed and failed hard, leaving people to believe that Microsoft may have learned its lesson. The arrival of UWP, however, has led to many stating that Microsoft hasn't learned a single thing, because it appears as though UWP is even more restrictive and problematic than GFWL. Not only are games believed to be limited to the Windows Store and a strict distribution, but the technical side of things is very limited too.

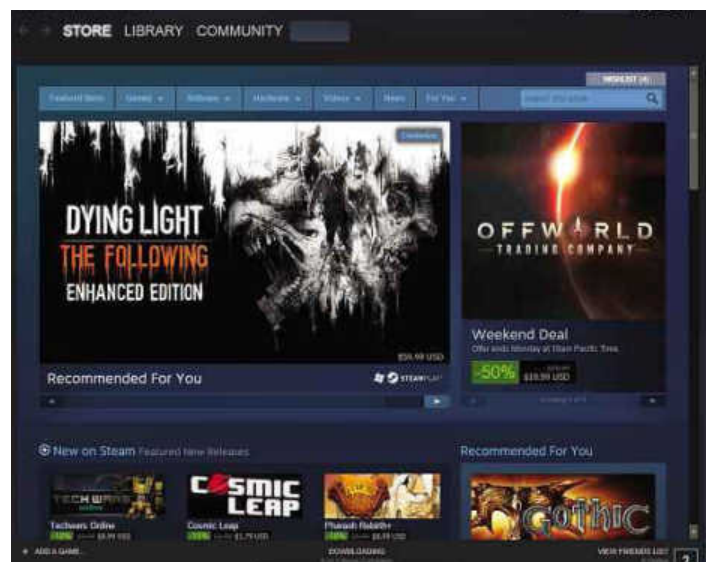
Games running under the UWP framework don't utilise the same framework or wrappers and so on that other games do. They don't even use traditional .exe files. Instead they run under the unique UWP system, which imposes some serious limitation on settings and features. Do you like all those features you get to play with to tailor the game for your machine and/or preference? Well, you may not get them with UWP. What's more, the UWP framework apparently restricts second- and third-party app support, meaning such staples as GPU control panels or video capture apps no longer work as UWP apps are not detected as compatible applications.

This flies in the face of traditional PC gaming, where supporters enjoy total control over their games and their systems. It's one of the major benefits that elevate PCs above console in many people's opinions, and with UWP Microsoft is severely damaging this.

To give you a better idea of this limitation, here are some things UWP doesn't support. First up, UWP apps don't support SLI or CrossFire, so users of multiple GPUs are out of luck and will basically waste half of the raw power of their GPU setup if they pick the UWP route.

Second, Vsync is always enabled. This can be a help, as it eliminates screen tearing, but it can also create problems such as performance drops and input lag.

Lastly, all games running via UWP run in borderless mode. This means games can't take control of your display entirely, like a Metro



▲ **Steam is the PC's de facto distribution platform**





▲ The Windows Store version of *Rise of the Tomb Raider* is far inferior to the Steam release

app. That means they can't make full use of the GPU. This will also limit performance.

These features are always present in other services, such as Steam or Origin and are always controllable by the user. With UWP, there's no arguing, and it's how Microsoft says it is – full-stop.

It's not just the core technical side either. UWP further alienates gamers by lacking support for modding, macros and overlays (such as Fraps).

This situation has already been seen in the high-profile title *Rise of the Tomb Raider*. Available on both Steam and UWP, the Steam version functions like a standard game, while the UWP version has the limitations the platform places on it. Because of this, anyone with any sense would buy the Steam version.

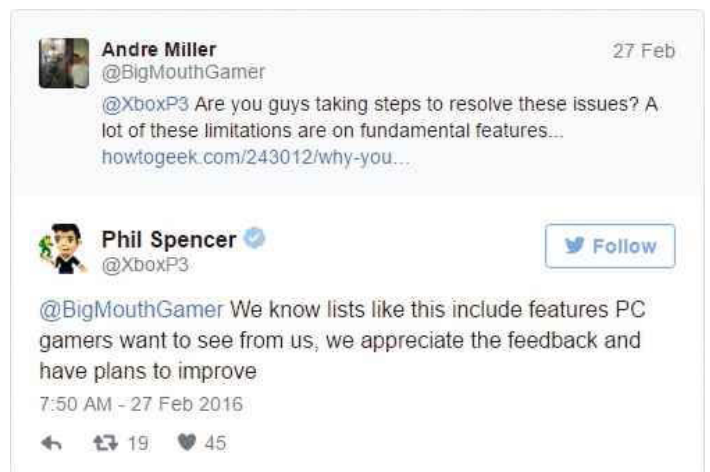
Phil Spencer is aware of these problems, however, and responded to this same information published on website HowToGeek (bit.ly/1OQgH6E).

"We know lists like this include features PC gamers want to see from us. We appreciate the feedback and have plans to improve."

The question remains: why has Microsoft not learned from previous mistakes, and why would these problems even exist? The company is hardly a newcomer to PC gaming and has had a major hand in the advancement of gaming, so why would such problems and limitations be found?

One the subject of big-name releases via UWP, another big game has been released exclusively via UWP: *Gears of War: Ultimate Edition*. This is an interesting one, as it comes from Epic Games. Does this explain Tim Sweeney's feelings on the matter? Probably.

As CEO of Epic Games, the company responsible for the *Gears of War* series, it has to be more than a little irritating that the latest edition of *Gears of War* is so limited in terms of sales. With no physical release on PC or availability on other services like Steam, which have far greater user numbers than UWP, Sweeney must



▲ *Gears of War Ultimate Edition* is exclusive to the Windows Store on PC

feel trapped. Microsoft owns the exclusivity for the series too, so there's no other avenue open for Epic here. This makes Sweeney's comment both understandable but also a little biased.

Backpedal

Another aspect of this whole subject that's angered gamers is Microsoft's U-turn on the exclusivity for upcoming title *Quantum Break*. Until recently, this was billed as an exclusive title for the Xbox One only, unavailable anywhere else. Now, however, Microsoft has confirmed the game is to be released on PC too, via the Windows Store, obviously, which has caused quite a lot of upset with gamers, with some even boycotting the game and others threatening to ditch the Xbox in favour of other platforms.

This is an overreaction, of course, as the game is still console exclusive on Xbox. It just means more people can play the game, a game Microsoft owns the IP for. That said, what if the whole UWP and cross-platform plans kick in and changes this?

At the moment, console and PC gaming are largely separate. While Microsoft, Sony and Nintendo all fight for supremacy in the console market, the PC remains detached, doing its own thing, with its own loyal army of gamers. If Microsoft plans to bring together all platforms, will this change? Could we see titles like *Quantum Break* playable on competing system, even if only via a streaming service? It remains to be seen, although the likelihood of this happening is very slim, even with recent announcements.

Sony has officially responded to Microsoft's announcement (via a statement issued to Gamespot - i.gamespot.com/1PaNlIdS) and it's actually fuelled the fire. Sony has said it remains open about the possibility, stating previous cross-play projects with the PC.

"PlayStation has been supporting cross-platform play between PC on several software titles starting with *Final Fantasy 11* on PS2 and PC back in 2002," said the statement. "We would be happy to have the conversation with any publishers or developers who are interested in cross platform play."

Sony's response certainly isn't a no, but it does omit specific details with regard to other console platforms, instead focusing on the software side of things. This leaves much of the responsibility with software developers and publishers. There's already some movement, though, as the popular indie hit *Rocket League* will support cross-play between PC and Xbox One. This is a feature already available on PS4, which supports cross-play between PS4 and Steam.

Adding Up

The various aspects we've covered here, including UWP, cross-platform play and Windows Store distribution may be disparate and not entirely related when taken on their own (and that may very well be the case), but if you consider Microsoft's long-running focus



▲ *Rocket League* is a big title supporting cross-platform play



▲ The Windows Store follows similar patterns to Apple's own App Store

on centralising its product line and now its wish to do so with other gaming platforms, it's not too much of stretch to connect the dots.

We don't really see the whole UWP and Windows Store debacle worrying console owners. Sony and Nintendo simply wouldn't let Microsoft have even a smidgen of this type of control. The Xbox One, however, could find itself tied more closely to the Windows Store and UWP as Microsoft moves the cross-development from PC and nobile and extends this to Xbox.

PC owners, on the other hand, are certainly facing potential problems, and if UWP and Windows Store integration continues, along with the limitations and control imposed on it, we could see a big shift in PC gaming, probably not for the good.

If Microsoft improves the service, as Spencer claims, it could be more usable, but it'll likely never be welcome, at least not in its current form.

Sweeney didn't just attack UWP and Microsoft's plans; he also said he had no problem with Microsoft having its own game distribution method. He even suggested how the situation could be improved. This mainly revolves around making UWP more open and not limiting availability of products through the Windows Store, but allowing them to be sold elsewhere too. He also suggested a more flexible system of commerce, removing Microsoft's monopoly and cut of every sale.

This sounds reasonable enough, and he also mentioned that there are options within UWP that can free up developers more, but these are largely hidden and deactivated by default. It's a sneaky way of operating, which he compares to Google and its open yet closed Android platform.

Worried?

Is Tim Sweeney right about Microsoft's plans for UWP, and is this something gamers and the industry have to fight? To be honest and fair, it's too early to tell, and there's a lot of information about the plans for UWP and the Windows Store yet to come. It's hard to argue for any form of overbearing control, though, and if Microsoft's plans measure up to Sweeney's fears at all, it'll be a bad thing, pure and simple. No one company should control the software of a platform, not even Microsoft, and when it comes to the PC, freedom is one of the platform's strongest features.

PC gamers aren't tied to a gaming platform as console players are with the likes of Xbox Live and PSN. Instead, they have a choice, be it Steam, GOG.com, Origin or none of the above. It's up to the user. Should UWP succeed in the feared method of control, this choice could be taken away, and PC gamers could find themselves in the same controlled situation as console gamers.

We'll have to wait and see how UWP plays out, but it's clear that any aggressive move by Microsoft will be met with resistance, and more developers will surely have something to say. One thing's certain: UWP and the Windows Store will be big news this year, whichever way it goes. [mm](#)

Can You Support Your Favourite Websites And Still Block Ads?

No one likes adverts. But how else can websites make money? Sarah Dobbs investigates



When you're reading a magazine, how much time do you spend looking at the adverts? Might be a risky question to ask in a paper magazine, but chances are you generally flip past them, unless maybe you're in the market for a new graphics card or something catches your eye. Most people don't exactly like seeing ads in the middle of their mag, but they're just there, aren't they? They're a part of the publishing landscape, a way for magazines to finance their existence, so you look at them, or you turn the page, and that's it.

Online, things are a bit different. Advertising is just as important to publishers (more so, even, because readers aren't paying anything to access online content), but people are less willing to tolerate them. Last summer, online publishers got a terrifying wake-up call when Apple enabled ad blocking in iOS 9. Suddenly, the top app in the App Store was an ad blocker. Google has banned

ad blockers from its Play store, but while that means Android users might not be able to block adverts on their mobile devices, their desktops are another story: Adblock is the most popular Chrome extension, with an estimated 40 million users. It seems pretty clear that if people are offered the opportunity to block adverts online, they're going to.

But should we be feeling guilty about that? After all, our favourite websites rely on ad impressions to pay their writers, keep their sites running smoothly and to pay their server bills. If you block adverts on a website, does that mean you're essentially stealing their content? Even if you don't feel particularly bothered by that, could blocking all adverts eventually mean sites you really like end up being shut down? Surely there must be a way to avoid getting pestered by auto-playing video ads and pop-ups without contributing to the downfall of websites we'd actually like to keep reading?

▲ 40 million people can't be wrong?

Pay For It

The obvious answer is that you could just pay for the content you're reading. Some websites insist on readers paying to access their content by implementing paywalls: the *Times*, for example, won't let you read anything past the first paragraph or so of an article without subscribing. (It costs roughly £1 per week, depending on which package you choose.)

Most of the sites that use paywalls are publications that started out in print and then moved online, like the *Wall Street Journal*

“ If you block adverts on a website, does that mean you're essentially stealing their content? ”

and the *Financial Times*, which makes a sort of sense; their readers are presumably used to paying to read them. But paywalls aren't always effective, and analysis of even big publications shows that their subscriber base isn't growing very fast, and the revenue they receive through their paywall system is dwindling. The problem is, on the internet, you can almost always find the same information somewhere else, so if you click to read an article and find it's locked up behind a paywall, you can probably just Google it and read someone else's take on the same thing for free. Last year, the *Sun* decided to remove its paywall for that exact reason; readers were

Why Peace Got Pulled

On 16th September 2015, iOS 9 launched, and with it the ability to block ads in mobile browsers. One app that took advantage of that capability was Peace, an ad blocking app created by Tumblr co-founder Marco Arment. Within hours, Peace was the most downloaded paid app in the App Store. It cost \$2.99 (£2.29) to download, which should say something about just how keen people were to block mobile ads.

Its success instantly made headlines, with some critics pointing out that it might not be entirely ethical for Arment to be making piles of cash off stopping other businesses from profiting from their work. As someone who had previously argued strenuously in favour of ad blocking (he even said people shouldn't feel guilty, because online ads use people's battery life, time and privacy without permission), Arment didn't seem like someone who'd be too upset about that.

But then, on 18th September, he pulled the app from the App Store. In a blog post entitled "Just doesn't feel good" (marco.org/2015/09/18/just-doesnt-feel-good), he explained that he didn't feel comfortable with the success of Peace, because while it benefited some people, it unfairly punished others.

Peace didn't have any way to distinguish between different kinds of ads, 'acceptable' or otherwise, so it just blocked everything. According to Arment, that made it too blunt a tool and one that didn't support the kind of online environment he ultimately wanted to encourage.

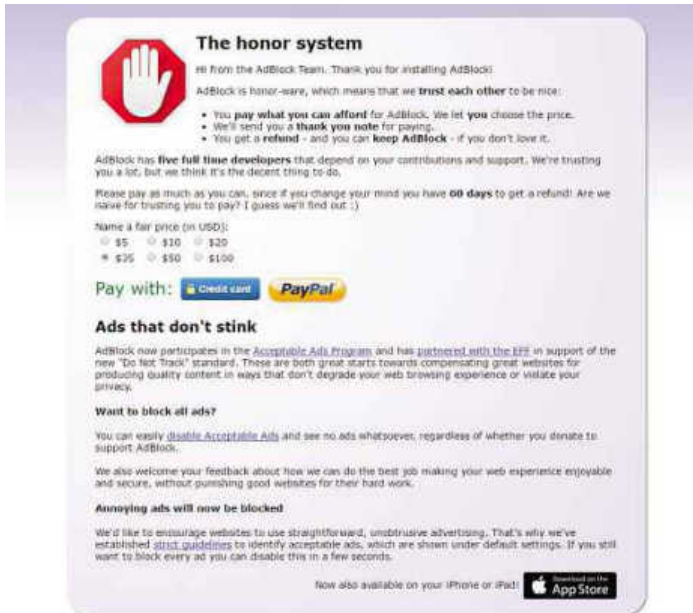
So everyone who'd bought Peace got a refund, and Arment went back to working on other products, like his Overcast podcast app. Meanwhile, anyone still wanting to block apps on their iPhone or iPad could still choose from plenty of other ad blockers, so this is still going to be an issue that gets fought over for a long while yet.



Peace: Block Ads and Trackers,
Powered by Ghostery®
Utilities

★★★★★ (107)

+ £2.29



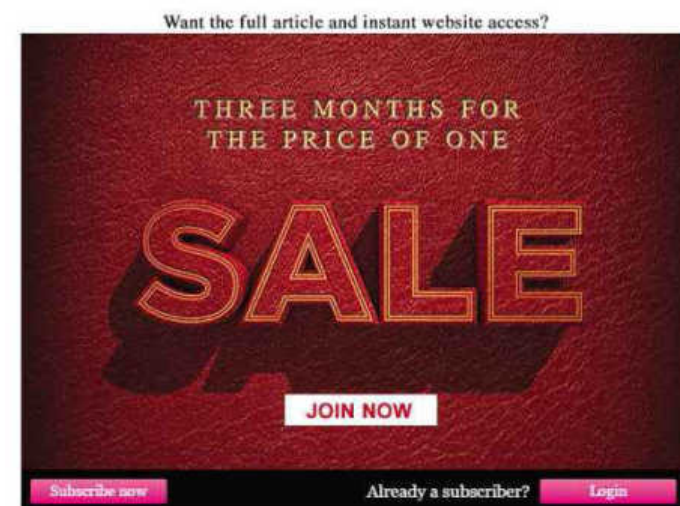
▲ How does Ad Block itself make money? By asking for donations

visiting rival sites, like MailOnline, that didn't use paywalls, so in order to compete it had to give up on locking away its articles.

Some online publications have chosen to ask for donations instead. Wikipedia, of course, doesn't display adverts but does run regular donation drives to ask for users' support with its bills, and many blogs have prominently displayed PayPal 'tip jars' for readers to bung them some cash. Other sites get a bit more sophisticated. For example, if you visit Wired's website with an ad blocker installed in your browser, you'll see a message pop up to ask you to consider paying \$1 a week to access a special ad-free version of the website. That seems pretty sensible, but there's no way of knowing just yet how many people are willing to do that. Again, the problem with the internet is that people might click away rather than putting their hands in their pockets.

Whitelisting

What if you don't want to have to pay to read something online, though? After all, each website might only be asking for a couple of quid at a time, but that can soon mount up if you read a lot of different sites. And donating occasionally, when you're feeling flush,



▲ If you want to read the Times online, you'll have to pay

Case Study: The Toast

How do you make money as an online publication? There are lots of examples of people trying and failing. The Toast (the-toast.net) might be one of very few examples of how to succeed.

Founders Mallory Ortberg, Nicole Cliffe, and Nick Pavich launched the site in July 2013, and right from the beginning they were determined to pay their writers and illustrators. Cliffe contributed the up-front cash to get the site going, but even so, within three months they were making a profit and have continued to do so since, to the point where they've managed to hire new staff, as well as continuing to pay their writers and illustrators.

How? Well, firstly, advertising, obviously. The site runs a limited amount of adverts, which are vetted for suitability to avoid annoying readers. It also runs a small amount of sponsored content, which is all labelled as such and tailored to fit in alongside its regular content.

But it's got a few other ways of raising cash too. For starters, there's merchandise: Toast branded T-shirts and tote bags featuring in-jokes and illustrations from the site's regular artists. Then there are donations. Every article on the site has a donation link at the bottom, suggesting that readers might like to leave a 'tip' if they liked the article. The suggested amount is just \$1, which doesn't seem like much, and the process for paying it is pretty simple. You don't even need to follow a link to another page: a PayPal form appears when you click the tip button.

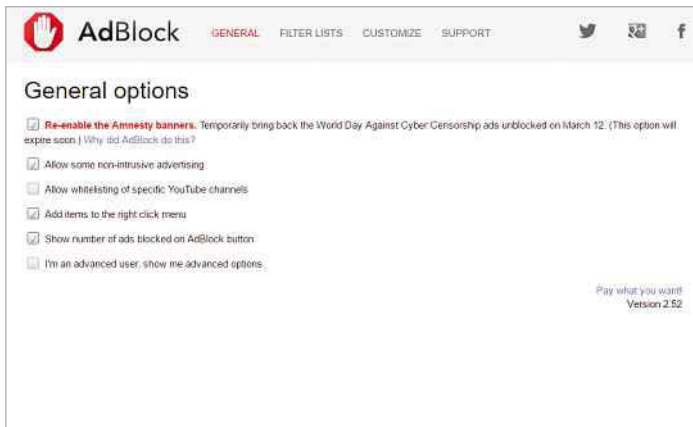
For readers wanting to donate more, there's a separate donation page, which lets people donate a sum of their choice, either as a one-off donation or as a regular thing. There's even a sweetener for anyone who wants to donate \$50 (about £36) or more: after paying up, readers can choose to sponsor a post. Depending on the amount, that might include paying for more ambitious work or even a whole series of articles.

This is a success story that comes with caveats, of course; the Toast's founders won't disclose exactly how much they make from the site, it only has a handful of staff to support and it has relatively few overheads, running mostly pop culture commentary and personal essays that don't require travel budgets or any of the other costs newspapers like the *Guardian* would have to cough up for. Still, it's a promising example.

is fine, but websites can't really rely on everyone remembering to occasionally bung them a bit of cash.

The other obvious alternative is to whitelist certain websites. That means your ad blocker will allow adverts on certain sites, but not everywhere, so you can decide you're willing to put up with seeing advertising on your favourite blogs, but not everywhere all over the internet. If you've found yourself annoyed with certain kinds of advertising, certain ad placements or just the way some sites absolutely plaster their entire home page with ads, you can block the really annoying ones while letting through the more considerate ads – a compromise that comes with much less guilt.

The same pop-up overlay on the Wired website that asks visitors to consider paying a fee also offers whitelisting as an option. (It even



▲ **Ad Block wants to encourage better advertising by letting users see only acceptable ads**

includes a link to a handy site explaining exactly how to add sites to your whitelist in a range of popular ad blockers, which is nice.) Other sites have taken similar measures: *Forbes* asks readers politely to deactivate their ad blockers, while *GQ*'s site sometimes locks readers out unless they either cough up \$0.50 or disable their ad blocking software on the website.

Still, these kinds of measures are currently in a minority, and it's a lot easier to just install an ad blocker and forget all about it. But that's not really a good option in the long run. Sooner or later, someone is going to have to come up with a way of funding websites without driving away readers or making them do things to circumvent the money-making bits.

Better Advertising

That solution, then, might be better advertising. If you install Ad Block now, you'll find that the setting to allow 'Acceptable Ads' is automatically enabled. From 2011, Ad Block has been working on an initiative based on the idea that not all advertising is equally annoying, and that blocking all of it isn't necessarily helpful. Instead, a list of criteria for Acceptable Ads was drawn up, and these kinds of adverts can be automatically allowed through Ad Block's filters.

The criteria are pretty strict. To meet Ad Block's standards, adverts should be placed on top of, beneath or to the side of website content, so they don't get in the way of reading the actual stories; they should always be labelled as adverts and not masquerade as content; and they should fit within certain size guidelines so as not to overwhelm the actual content. (There are some other requirements, too, including a ban on excessive use of colour; you can read the whole thing here: adblockplus.org/en/acceptable-ads#criteria.)

The long game here is pretty obvious: if Acceptable Ads make money while other, less 'acceptable' forms of advertising are blocked

The Problem With Advertorials

Here's another problem that ad blockers contribute to: the rise of online advertorials or undisclosed ads. Imagine you're a blogger who wants to turn your website into a business. If most of your readers run ad blocking software, you're not going to be able to make much from ad revenue, which means you need to turn to other sources – things that ad blockers won't remove. Things like sponsored content that's paid for by businesses, but isn't labelled as advertising, for example.

That kind of advertising is the most insidious of all, because it masquerades as someone's real opinion – and sometimes, it is, or as close to a real opinion as anyone can have when they've been paid to try a product. But most readers hate it and, more importantly, it goes against the Advertising Standards Agency's Advertising Code, which states that all ads should be obviously identifiable as ads.

Over the last couple of years, the ASA has started to crack down on undisclosed advertising, especially in relation to YouTube vloggers, who are now required to put a disclaimer in the title of any video that contains paid-for content. Technically, bloggers should do the same to avoid breaking the law. But it's easy to see how that kind of advertising might slip through the net and how tempting it might be to accept money for promoting things if you can't otherwise make money off writing a blog – even one with a massive readership.

out and don't, then gradually more and more adverts will start to be designed more sympathetically, meaning users don't get annoyed, and publishers get to make money. Ad Block wants most of its users to allow Acceptable Ads, which is why the feature is enabled by default – though you can turn it off if you really don't want to see any ads, ever.

But Ad Block's research suggests most people are behind the idea. 75% of users surveyed said they were happy to accept some heavily vetted adverts in order to support businesses, which seems pretty encouraging.

No Answers

Ultimately, there isn't an easy and obvious answer to this problem. Experts estimate that online publishers will miss out on a whopping \$41 billion (about £29 billion) thanks to people using ad blockers this year, which is going to be hard to recoup through a few digital donation boxes. And here's an added twist of the knife: according to a report published by the International News Media Association, the very people who are most likely to install ad blocking software are the exact demographic advertisers most want to reach, because they're generally young and tech savvy.

That report, titled *What To Do About Adblocking*, did offer a ray of hope, though. It turns out when people who run ad blockers do see advertising, they're more likely to interact with it (i.e. click on it and maybe buy something) than people who don't. That should be an added incentive to websites to make sure their advertising fits the Acceptable Ads criteria, as soon as possible. There could be serious money in it.

For now, though, all I can really recommend is, if you're going to run ad blockers, do take a minute to check whether you really need to block all ads, or if you can set up your software to allow through some ads without causing yourself too much annoyance. It's the best idea anyone's had so far for supporting sites you love without having to put your hand in your pocket. [mm](#)



▲ **Would Wired's plea convince you to turn off your ad blocker?**

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Your Letters

Failures In Sponsoring Science And Technology

I'm writing to you, having read the article about the Raspberry Pi 3, in which it was stated the UK government could see no future in the project. How wrong they were.

It is to be expected that the civil servants who serve this country see no further than their noses. Since the Second World War, we have been let down by our so-called servants in many ways. A few million pounds here and there to develop new ideas from the drawing board to the production of a world beating product have been squandered by the advice given by the self-serving civil servants to politicians who only care about their next election and trashing the opposition.

We had once the ability to launch our own satellites, but the civil servants could see no future in it. How wrong they were, because now launching satellites is worth millions of euros, roubles and dollars a year.

Our formidable advance in computers during the Second World War was again squandered and hidden under a veil of secrecy. Where

a civil servant could see no more than two being used in the country, most of our population have one far more powerful in their pockets.

I would like to bet that the number of senior civil servants with a science or technology degree can be counted on one hand, as the shambles with implementing computer systems shows. The cost overruns and the system not being able to do what the providers claim is proof that a civil servant with a first in Greats or History has absolutely no idea what technology can do for us. It's no good being able to remember the whole of the 1272 law on household fires or being able to translate ancient Greek into Latin and then to English or quote Homer when talking to a salesman trying to sell you a system that he knows will not do what you want it to. He will still get his commission no matter what, and another billion or so goes down the drain. Until our civil servants stop looking down their collective noses at what they perceive as trade, we will continue our slow decline.

Dave Shaw

It Must Be True It's On The Telly!

I really don't understand the FBI versus Apple situation. I've watched all of Series 1 of *CSI Cyber*, the reality TV show about the FBI's cyber crime division, and surely they're on the case? Just call in Avery Ryan, get her reformed hackers to go tippety tap on a keyboard for a few minutes and job done.

Dave Williams

The Dark Side Of Tech

The recent article about buying an SSD for £5 just proves how obscene the profits of big technology companies are. Yes, it's a small amount of storage you get for that price, but put that same storage in a smartphone or tablet and suddenly manufacturers think it's okay to charge consumers several hundred pounds for it.

This mark-up is huge, but that's not the end of the story. Also consider who's making this storage. Probably poorly paid overseas workers, toiling away

in badly ventilated sweatshops and getting abused by their managers, until they eventually die or commit suicide. And at the same time, of course, they use loopholes and political influence to avoid paying tax.

What can ordinary customers do about it? Very little, apart from not buying things they need or want. Like everyone else, I end up buying technology, because it interests me, but I can't help but wonder how much damage I'm contributing to.

Marcus Brent

GET IN TOUCH...

By email

letters@micromart.co.uk

By post

Micro Mart
30 Cleveland Street
London
W1T 4JD

Online

forum.micromart.co.uk

Component Watch

Touchscreen desktops are still fairly niche, but if you want to give the technology a go, here are some bargain monitors for you to take a look at...

Windows 10's touchscreen features seem a lot better than Windows 8's, but if you want to make use of them on a desktop system you'll have to buy a touchscreen monitor, of course. There aren't all that many around, and separating the ones aimed at home use from those aimed at point-of-sale systems can be a little difficult. That's why we've sorted the best from the worst so that you can find the right touchscreen monitor at the best price available.

Deal 1: Lenovo ThinkVision T2014

RRP: £115 / Deal Price: £88

This 19.5" monitor is as cheap as touchscreen technology of this kind comes, and it's pretty basic as a result. It provides 1600x900 resolution and a 5ms response time but it's limited to DVI-D and VGA inputs, which means it's probably best suited to business or public-facing contexts where its lack of interfaces and features aren't likely to be a problem further down the line. Still, for under £90, it's not a bad deal at all if you're just after something with a touch interface!

Where to get it: Dabs (bit.ly/1o94Gn9)



Deal 2: Dell P2314T

RRP: £180 / Deal Price: £156

Spend £50 more, and you'll get something far more suited to home use. For a start it offers a 1920x1080 resolution, which means it's full HD compatible. Between that and its widescreen 23" display, it's almost as good for watching movies and playing games on as it is for jabbing with your index finger. The 8ms response time is perhaps a little longer than most enthusiasts would want, certainly if they are wanting to use it for gaming, but it's a satisfying budget option as far as we're concerned, with a decent discount making it even more attractive.

Where to get it: Box - <http://bit.ly/1RnOCpN>



Deal 3: Hanns.G HT231HPB

RRP: £180 / Deal Price: £176

This 23" widescreen monitor is broadly the same as the Dell. The extra few quid gets you a slightly superior panel, with a 5ms response time and multiple video settings, including PC, movies and gaming-specific modes and a power-saving mode, though. It's also certified compatible with Windows 8 (and by extension, Windows 10). Basically, if you can handle the low-profile stand (designed to sit at desk level) we can't think of any good reason not to pick it over Dell's screen.

Where to get it: Insight (bit.ly/1RjlmTu)



Deal 4: Iiyama T2452MTS-B1

RRP: £250 / Deal Price: £180

Jump up a price tier and you'll find even more features. Iiyama's touchscreen monitors tend to be upgraded versions of its high-end model, and that means this one's got all the quality you'd expect – a 2ms response time, HD resolution and a foldable stand that allows you to orient it in almost any angle you please. A solid screen from a reliable manufacturer.

Where to get it: CCL (bit.ly/1RBvn1w)



Deal 5: Viewsonic 24" LED TD2420

RRP: £250 / Deal Price: £198

This 24" screen has everything you'll find on the cheaper monitors, as well as a pair of 2-watt speakers and scratch-resistant screen. The large discount and well-rounded feature set makes it the best we've looked at by some distance – so if you want something that can replace your regular screen, this is the one to go for.

Where to get it: Saverstore (bit.ly/1RBvjP9)



Alphabet Pi:

David Briddock meanders through Raspberry Pi technology from A to Z

D

THIS WEEK: Distros, Debian, Desktop and Development

Distros

Being a general purpose computer, the Raspberry Pi supports a number of operating system distribution images (aka distros). Apart from the official Raspbian, there are a number of other Linux-based alternatives such as Ubuntu Mate and the lightweight Snappy Ubuntu Core.

There are some specialist distros too. RISC OS is a modern version of the BBC Micro operating system, complete with BBC BASIC. The Open Embedded Linux Entertainment Center (OpenELEC) and the Open Source Media Centre (OSMC) are small, heavily modified Linux-based distros that turn the Pi into a media centre. And PINET is a centralised user accounts and file storage system designed for classroom environments.

“ The default Raspbian desktop environment is called LXDE ”

In 2015, Microsoft decided to enter the distro fray with its Windows 10 IoT Core. This slimmed-down version of the Windows 10 operating system is intended to encourage Internet-of-Things (IoT) initiatives and software development.

Debian

Debian was one of the first distributions to emerge from the Linux open-source community, with the first stable release appearing way back in 1996. Development heavily relied on software from the GNU project (gnu.org) and in the early days it attracted funding from the Free Software Foundation (fsf.org).

The Debian image (debian.org/releases) has a reputation for solid reliability, with lengthy spells between releases to ensure adequate time for testing. This is an attractive feature and has meant Debian is also used as the basis for other more specialised distribution images. One of these is the Raspbian operating system (raspbian.org).

Major releases of Debian Linux are named after characters from the *Toy Story* films. A previous Raspbian distro was based on Debian Wheezy, named after the *Toy Story* 2 penguin who'd lost his squeaker. The latest stable release of Debian, version 8, is named Jessie (debian.org/releases/stable) and is the basis for the Raspbian Jessie distro.

Desktop

The default Raspbian desktop environment is called LXDE, which stands for Lightweight X11 Desktop Environment. Being lightweight means it doesn't stress the CPU or graphics processor – an important factor with computers like the Raspberry Pi.

LXDE is written in the C programming language and uses the GTK+ Toolkit (gtk.org), also known as the GIMP Toolkit. The GIMP Toolkit is a very popular cross-platform open-source project specifically created to help developers create rich graphical user interfaces (GUIs).

Development

The Raspberry Pi Foundation is always looking for system solutions that encourage coding. From the very beginning, the Raspbian operating system included Python, a popular and easy-to-learn programming language. Various Python libraries were also included, including one that simplifies access to the GPIO pins.

Scratch is another popular Pi language. Here coding is done by snapping-together coloured blocks rather than lines of hand-written code. It's especially good for graphical and animation projects, which means it's a firm favourite in many classrooms. Scratch also has full support for the GPIO pins.

Recent Raspbian distro images included Java, a powerful language used by many professional software developers. Raspbian Jessie also includes two apps called BlueJ and Greenfoot, both aimed at simplifying the Java app building experience. They have a highly graphical coding environment, which blends mouse-driven design and code generation with traditional hand-coded statements. [mm](#)



Remembering... Ultimate Play The Game

David Hayward has fond memories of one particular software house back in the 80s

A few weeks ago, we wrote about Ocean and Durell. Both of these videogame publishers were synonymous with high-quality gaming on the Spectrum. Mention them even today, 30-odd years after the end of the 8-bit era, and you'll find many people have fond memories of them.

However, there was one software house that stood out from the crowd. One that even the giants of the 8-bit world looked up to. You could say that this one software house was the ultimate, and you wouldn't be far wrong.

Ultimate Play the Game (aka Ultimate) was almost worshipped by Spectrum owners the country over. With games like *Jetpac*, *Pssst*, *Tranz Am* and *Cookie* starting the company off on the 16K Spectrum, it work just kept getting better.

Who can forget *Atic Atac*, *Lunar Jetman*, *Sabre Wulf* and, of course, the company's radical 3D isometric *Filmation*?

As well as the games, there were also the large and elaborately decorated boxes that the games came in. And they cost a few weeks' worth of pocket money to buy one.

There was also a certain level of elusiveness about Ultimate. The Stamper

brothers, Tim and Chris, held legendary status among other developers and the gamers, but they were also quite mysterious with regards to the business and even themselves – which heightened the company's reputation and mystique.

Its History

Ultimate Play the Game was actually the trading name for Ashby Computers and Graphics Ltd (remember the ACG Key from *Atic Atac*). It was set up in 1982 by brothers Tim and Chris Stamper, both of whom were former arcade developers.

There were two other founders of the company too, who don't get quite as much recognition, Carole Ward (who later became Tim's wife) and John Lathbury. The company headquarters was a modest building next to the family newsagents in the Leicestershire town of Ashby-de-la-Zouch.

The first release under the Ultimate name was *Jetpac* in May 1983 for the 16K Speccy. According to internet legend, the Stampers sold more than 300,000 copies of the game, which is pretty impressive considering there were probably only around a million Spectrum users at that time.

Selling their game to a third of the computing population meant that there was room for the team to expand into more games and take advantage of the new 48K Spectrum.



▲ What 40-something gamer isn't moved by this?

After getting a number of equally successful games under its belt, Ultimate released its first *Filmation* 3D isometric title, *Knight Lore*. Although 3D isometric games were around before *Knight Lore*, the pressed hailed it as "an outstanding game", "perfect in every sense" and "impossible to complain about".

In 1985, the Ultimate brand was sold to U.S. Gold, but the Stampers had set up a new company under the name of Rare Ltd, backed by Nintendo for the development of games on the NES.

After several successful years, Rare Ltd was eventually bought by Microsoft (for \$375 million no less) and still produces games for the Xbox such as *Kinect Sports* and the soon to be released *Sea of Thieves*.

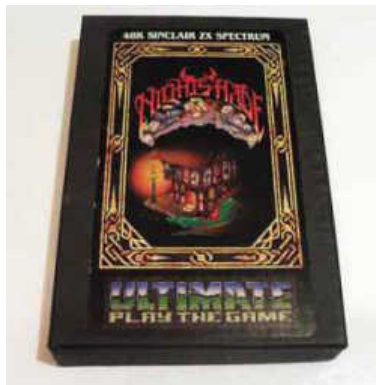
These days, the Stampers are busy in the mobile world, working with FortuneFish (Tim's son's company), and they're just as secretive as ever.

Conclusion

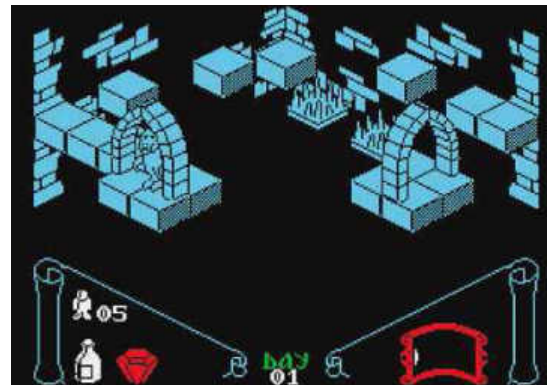
Tim, Chris, Carole and John, thank you for so many fond memories. [mm](#)

Did You Know?

- According to Tim, they only had two Christmas mornings off throughout the whole of Ultimate's lifespan.
- Was there really a trailer in *Lunar Jetman* or not?
- Apparently, Ultimate had the biggest sales share of any software house for the Spectrum.
- At an award ceremony, according to Roger Kean, when the award for Ultimate was called out, the brothers pulled up in a limousine, walked up to the stage, collected the award and promptly walked back out of the building and back into the limo to drive away.



▲ The incredible boxes and designs by Ultimate. A higher than normal price for a Spectrum game, but worth it



▲ *Knight Lore*: it's amazing what you can do with just 48KB of memory



FBI Backs Down

It's going to try to go it alone in iPhone unlock case

Pro Sound For Home Vids

Audio editing packages from Magix

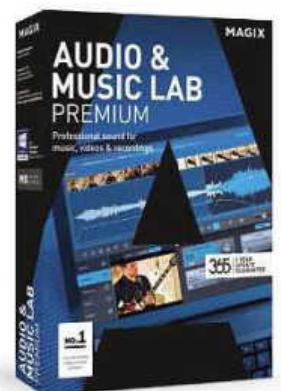
In its day, *You've Been Framed!* was a superb slice of television. Airing in the comforting teatime slot, we remember laughing over a dog riding a skateboard while it unwrapped a chocolate bar and performed a 360-spin much fondness. Or something like that.

Home videos have come a long way since the grainy VHS camcordings of the show's early days, however, and now our friends at Magix have released yet another range of software to help you perfect your own video creations in this newer, digital world. Its Audio and Video Cleaning Lab range has been given a timely update, so we now have new versions of Audio Cleaning Lab, Video Sound Cleaning Lab and Audio & Music Lab Premium, all three of which promise a boost to sound optimisation.

Designed for newbies to audio editing, Audio Cleaning Lab is probably the best place to start – with a simplified project window and a range of new practical features, including an intelligent search feature, spectral display with preview, and effects arranged according to importance. Video Sound Cleaning Lab also has, we're told, faster video import and 150 presets for optimising video acoustics, while Audio & Music Lab Premium offers four tracks for digitally editing, optimising and playing recordings in the highest quality.

Also, for the first time, the range is backed by Magix's update guarantee, which assures users that a full year of new features and extras for free, plus the latest version of the software at all times.

The website for more details on each of these is at www.magix.com.



Just as the iPhone unlocking case was reaching a critical point in its passage through the US legal system, the FBI has decided to walk away from the showdown, albeit temporarily.

Specifically, it requested the case be suspended for a month while it explored alternative ways of getting into the phone, and the court has granted its wish. This gives it time to try other methods of cracking the iOS security protocols without Apple having to get involved.

This is an interesting development, as the FBI has repeatedly stated that it needed Apple to come up with a method of breaking its own phone because it couldn't do it. Now, apparently, that might not be the case after all.

The filing does, however, mention an "outside party" (said to be Israeli firm, Cellebrite) that has demonstrated a possible exploit. If it works, the FBI can possibly get what it wants from the phone without Apple's help. Which is, perhaps, even scarier than it winning the case.



How many websites do you pay to access? If you're like the majority of people, then the answer is probably none. That, of course, is thanks to the presence of advertising – a subject that's become an increasingly sore point for many websites, which are suffering the consequences of ad blockers.

Online ads are frequently annoying, but they are a necessary evil. If advertisers know that no one's looking at their material, why would they then pay for it to appear on websites?

Of course, if you've made a vow not to feature ads at all, then ad blockers are neither nor there. That's exactly the position Wikipedia is in. It doesn't charge for content, and it doesn't feature ads, so all it has are donations.

In spite of all its problems, I'm happy to say I believe the world is better off with it than it without it. Perhaps a paid-for version with professional editing would be good, but it seems clear no one would be willing to pay for it.

Anthony

Editor

Apple's Fresh Bites

Small steps for iPhone and iPad Pro

In what was a relatively modest keynote for Apple, the headline news is arguably the announcement of a new iPhone, the iPhone SE. Rather than offering up anything particularly groundbreaking, Apple has instead opted to persuade us to pick up a new 4" handset that promises the power of the iPhone 6S with none of the bulk.

Available in 16GB and 64GB capacities, this new model is powered by the A9 chip, and armed with a 12MP iSight

camera and 4K video recording, TouchID and a Retina Display. Delivering a smaller but powerful handset at a decent price point – it will cost from £359 here in the UK – Apple might just be able to entice previous non-converts to its product line.

The other notable announcement surrounded the iPad Pro, which is now going to have a smaller, 9.7" Retina Display chum. Significantly, the new iPad Pro will cost £499, which we'd reckon will seem far more palatable to potential

buyers. For your money, you get a far more portable version of its well-received bigger brother, four speakers, an A9X chip under the hood and the Apple Pen and Smart Keyboards as possible accessories.

So, again, while neither of these announcements are game-changers that will convert die-hard naysayers, they could certainly entice plenty of waverers to Apple's door by providing options which, while not cheap, are certainly more appealing than some of its pricier models.

Meanwhile... On The Internet...

A stone-cold tech buzzword for decades now, the term AI is somewhat divisive. Either it's the holy grail of the technological cutting edge, a brave new frontier encompassing all that computer technology should aspire to, or it places us on a slippery slope that could end with us – for one (tinyurl.com/MMnet07a) – welcoming our new robot overlords (tinyurl.com/MMnet07b). As far back as 2001's HAL9000, right through *Demon Seed* and on to *Terminator*'s Skynet, the idea that artificial intelligence could turn against humans for whatever reason has been a long-running movie trope (tinyurl.com/MMnet07c) that was also well explored, of course, in sci-fi novels prior to this. Last week, Microsoft did very little to allay any fears we may have had (tinyurl.com/MMnet07d).

It all sounded innocent enough: Tay was a chatbot created by Microsoft (tinyurl.com/MMnet07e) to "engage and entertain people where they connect with each other online through casual and playful conversation", aimed squarely at interacting with millennials (tinyurl.com/MMnet07e), 'learning' how to better converse with them as it went. Trouble is, how it went was 'badly' (tinyurl.com/MMnet07f).

Less than 24 hours after it had greeted humanity with its first "Helloooooo World" message, Microsoft engineers had been forced to put Tay back to bed for a while (tinyurl.com/MMnet07g), after it began making racist and genocide-supporting tweets (among a whole host of other, erm... interesting comments) from its @TayAndYou Twitter account. Its less than savoury sentiments were apparently generated under the influence of its meeting with the denizens of that dark miasma we call 'social media' (tinyurl.com/MMnet07h).

There have been a ton of blogs trying to put their finger on exactly what went wrong (tinyurl.com/MMnet07ii) and who was to blame (no prizes for guessing who was top of the list: tinyurl.com/MMnet07jj). But perhaps the most interesting reaction we've come across asserts that Tay.ai worked perfectly (tinyurl.com/MMnet07k) and that the embarrassment Microsoft has suffered is endemic of the tech industry's wider 'Design Bias'. This phenomenon is where creators of technology suffer from blind spots that work against certain ethnicities (tinyurl.com/MMnet07l), genders (tinyurl.com/MMnet07m), or simply Twitter's (tinyurl.com/MMnet07n) propensity for watching the world (or, more often than not brands: tinyurl.com/MMnet07o) burn.

In all honesty, though, it comes down to one simple point. As the whole Boaty McBoatface thing has proven (tinyurl.com/MMnet07p), the internet is full of pranksters and trolls who are either brilliant or a menace, depending on which side of the fence you fall on any particular day. This, quite simply, is why we can't have nice things (tinyurl.com/MMnet07q)...

.AVWhy?

Videos For Your Eyes...
Not Necessarily For Your Brain

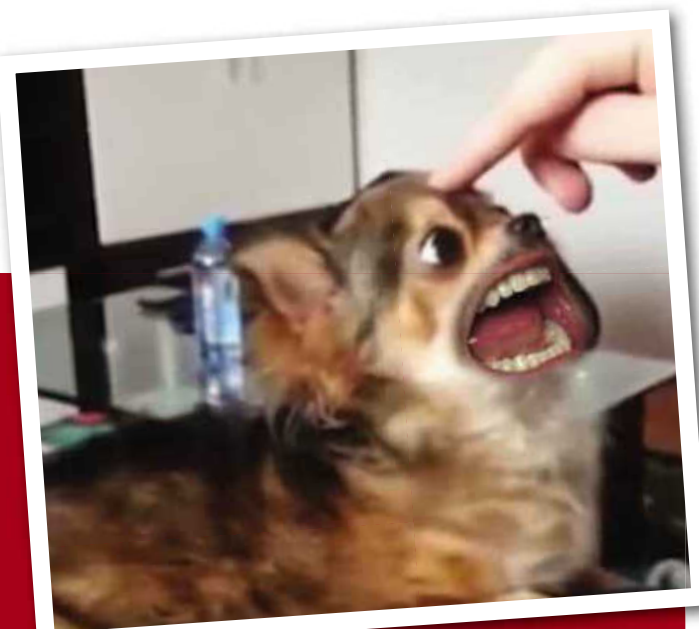
If you're a doggy person, you're either going to love this or blame it for ruining everything you hold precious in the world. Don't blame us, whatever the outcome; have a word with YouTuber Markiplier who thought it would be funny to superimpose his own, very human, mouth (and voice) over some of the internet's best doggy footage. He was right, it is very funny... but also disturbing in ways we can't even begin to explain in such a limited space. Enjoy (tinyurl.com/MMnet07aa).

Google has once again become the target of the British music industry, it would seem. The week after the American RIAA attacked the firm over the amount of royalties YouTube pays out, various reports last week tell us that it has since come under attack (tinyurl.com/MMnet07r) from the British Phonographic Industry (BPI), a trade organisation representing UK record labels, for not doing enough to direct people to legal means of downloading or listening to music (tinyurl.com/MMnet07s).

For its part, in what appears to amount to a corporate eye-roll (tinyurl.com/MMnet07t), Google pointed out that it had looked into 80 million alleged links to pirated material in the previous month. Also, it says it's making changes to its search algorithms to try to promote legal services and push down sites that receive a lot of takedown requests. The BPI is gunning for 'take down, stay down' solution, essentially obliging Google to ensure content cannot simply be relisted and reappear after it's taken down. Google was keen, once again (tinyurl.com/MMnet07u), to point out that this proposal has the potential for overreach, leading to censorship of legal material (tinyurl.com/MMnet07v), and it would do little to halt visits to sites like the Pirate Bay. Expect this one to rumble on... and on... and on... and... oh, you get the point.

Pokémon is one of the great symbols of Japanese gaming culture, and no Pokémon represents the brand more iconically than the cute, cuddly, shock-you-into-submission yellow ball of frustration that is Pikachu. Get multiple Pikachu's together, into a coordinated dance routine, and you've got a whole barrel of cute (tinyurl.com/MMnet07w).

Redub that footage with Beyoncé's *Formation* (tinyurl.com/MMnet07x), however, and you get two things: a sniggersome remix and an interesting inversion on the 'Beyoncé Always On Beat' meme we enjoyed last year (tinyurl.com/MMnet07y). So could Pikachu be coming for Queen Bey's crown. Who knows. As *The Verge*'s Jamieson Cox astutely points out (tinyurl.com/MMnet07z), "The mechanisms that govern successful memory lie somewhere beyond the outer edge of my brain." Same here, Jamieson. Same here.



Caption Competition



"So that's what was in the Pulp Fiction suitcase!"

This excited bunch were the fodder for *Micro Mart* issue 1405's caption competition. Here are the best suggestions:

- **Ondrive:** "George Osbourne's social media team assesses suggestions for exactly where he should stick his budget"
- **doctoryorkie:** "Finance department finally realise where profits have been going."
- **Martin Prince:** "A simple typo when Googling 'US election' caused Malcolm a fair bit of embarrassment... No one else seemed to mind, though."
- **doctoryorkie:** "New larger screen means more people can i hate."
- **wyliecoyoteuk:** "Wow, I never thought you could do that with a cucumber and a packet of spaghetti!"
- **Thomas Turnbull:** "Wow, Google has bought Microsoft. Will they call themselves MICROGOOGLE or GOOGLESOFT"
- **Ondrive:** "Wow, with this 4K monitor you really can see individual hairs... Not sure why you'd want to, though."
- **Thomas Turnbull:** "What on earth have you Googled???"
- **John Gower:** "OMG! It's the Any key!"
- **Terry Martin:** "The FBI have finally cracked that Apple iMa... Er... no, hold on, that's not right, is it?"

Thanks for all your submissions, but the winner is Gavin Cambridge with "So that's what was in the Pulp Fiction suitcase!"

If you have something to say about the picture below (come on, you must have), head to the 'Other Stuff' section of our forum (forum.micromart.co.uk), or email us your funnies via caption@micromart.co.uk, remembering to add the issue number to the email.



Sony Looking At 4K PS4?

Several sources suggest this is really a thing

According to several media reports on the world wide web, Sony is apparently working on a more powerful version of its PS4 console, aimed squarely at accomodating 4K technology.

The new-and-improved PS4 would, the rumours say, sport improved graphics power that

would be capable of playing titles in 4K resolution, which in turn would require an upgraded GPU to do so.

The idea is surely to better cope with the demands of the PlayStation VR, and it's unclear whether this would be an entirely new console or also offered as an upgrade to current PS4 consoles.

Xbox Live Stays Free In China

People aren't happy

In China, Xbox users can access the Xbox Live service for free. No money. Nothing. The problem with that is that sometimes 'free' doesn't mean 'best'.

Many Xbox Live owners there would, reportedly, rather commit to a paid-for subscription because the Xbox Gold service in the country is limited when you compare it with other countries; limited

because of China's censorship laws, predictably.

China is actually the only country with a free version of the Gold service but when it's a limited iteration, you can understand why that would anger many.



Snippets!

Apple Using Google

Aw, this is nice...

News sites have reported that Apple is using Google's servers in order to store some users' iCloud data. Clearly, this is quite the story for Google, with Apple having signed an agreement for the storage solution last year. Apple is also spending big on its own data servers so, presumably, once they are up-and-running it won't be reliant on Google, or anyone else, for storage in the not-too distant future.

Cyber Ready Girls' Day

Over 40 girls from across five London secondary schools attended a Cyber Ready Girls' Day at The National Museum of Computing. The full-day event was put together to dispel the myth that technology is "not for women" and to promote the range of possible career opportunities available to girls in various industries and sectors.

There were presentations from several industry professionals and the students also had the chance to try some coding.

Vive VR Experience

The Overclockers UK showroom in Newcastle-Under-Lyme now has a permanent Vive Room Scale VR Experience, which will allow visitors to move around a big old room and get a taste of interacting with a virtual environment.

Quite naturally, Overclockers is also pushing its own VR Gaming PC system for potential Vive headset buyers, which start from £749. You can, of course, read much more on all of this at www.overclockers.co.uk/virtual-reality.

PlayStation VR: Comparatively Cheap?

Not as cheap as it first seemed, certainly

With the cat out of the proverbial bag, Sony's PlayStation VR headset came as a welcome announcement to consumers, especially as a price tag of £350 seemed far easier to stomach than the much higher prices attributed to its rivals.

The thing is, that £350 is a little misleading: the core package will indeed cost that, but without PlayStation Move controllers to play and a PlayStation Camera for positional tracking, you're stuck. In reality, then, you're talking another £70 or so to really get to grips with this technology. Oh, and don't forget the PS4!

It would seem prudent for many, then, to opt for Sony's VR Launch Bundle, which will include a headset, necessary cables, stereo headphones, two Move controllers and a PlayStation Camera, plus the PlayStation VR Worlds game. US pricing is \$500, and that's quite key as this hasn't been

announced for the UK at the time of writing. Assuming it will come to our shores at some point, we'd expect it to be around £420-£430.

Whatever the price, the strong PS4 user base is surely going to snap this headset up in some form or another. Will this be the unit that moves virtual reality to the mass market?



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New Bag, Sir?

Laptops look fine in these fellas

Australian bag and case manufacturer STM has announced the release of its new Velocity collection to protect and organise your digital gear.

STM's new SlingTech Protection interior cradles the user's device, suspending it from the bottom of the bag, while the bottom corners are also reinforced with additional padding. The CableReady

organisation also keeps the bag uncluttered when charging devices, running the charging cable neatly from the battery to the bag interior. The routing system also uses multiple pockets, with ports between sections and integrated cable management.

There are six bags in the range, priced from £35 (the 'Haven', pictured, will set you back £75), and www.stmbags.com is the website to hit for more information.



Nintendo's Mobile Debut Is Out

Social app gets mixed reviews

Japanese mobile users now have the honour of being the first to play Nintendo's inaugural smartphone app.

MiiTomo is basically a social messaging mobile app that uses gamers' Mii avatars in order to message each other and share posts. Gamers are encouraged to answer questions about what they like and don't like and over a

million users had downloaded the app within days of its appearing in app stores.

Some media reviews have been relatively positive about the user experience, others less so. This is clearly going to live or die on the back of the strength of Nintendo's brand and it's an extremely limited social networking service. Still, something different for Nintendo to focus on.

Google Glass 'Enterprise Edition' Seen On eBay

Unreleased successor to original Glass, apparently

A California-based pawn shop had listed on eBay the 'Google Glass (black)' with associated imagery suggesting a headset with a folding hinge, LED light and charger.

Mac blog 9to5Mac first spotted the listing and, while

we cannot say for certain that this was genuinely one of Google's new toys or just one massive hoax, it looked real enough to others out there that it was going for thousands at the point seller withdrew the auction because of an "error" in the listing.

Make of that what you will.

Micro Bits Handed To Schoolkids

Thousands of children given BBC computer for free

The BBC's Micro Bit initiative has been anticipated for a while, and finally schoolchildren are getting their hands on one of the computers as they have been handed out to thousands of pupils across Britain.

Year 7 children have been targeted by the initiative and they were actually supposed to be distributed before now. Still, better late than never. The Micro Bit has built-in sensors and LEDs which makes it perfect for a range of projects such as display boards or making music. The real challenge with these computers, of course, will be down to teachers (and parents) to encourage students to really get to grips with some unique and interesting applications.

Whatever they are used for, it's just heartening to see an initiative that is actively encouraging young people to get into coding.

Twitter Turns Ten

Did you get the email, too?

Twitter users were emailed a Thank You message on 21 March in recognition of the social messaging platform having been around for a whole ten years.

In that time, Twitter has seen marriage proposals, official royal messages and an awful lot of sharing, be it factual or fictional, humorous or serious. There's is no getting away from the fact that Twitter can be a horrible place to hang out – Jon Ronson's excellent book on public shaming is worth a read on that – but it's also proven to be as much of our daily digital lives as Facebook has managed to be over the years.

And plans to increase the 140-character limit have been quashed with CEO Jack Dorsey telling NBC's Today Show in America that "it's a good constraint for us and it allows for of-the-moment brevity".



Asus ROG G20

One of the most extraordinary PCs we've ever seen

DETAILS

- Price: £1,300
- Manufacturer: Asus
- Website: goo.gl/9Gv5Mu
- Requirements: Keyboard/mouse, two spare power plugs, Microsoft/Windows account

Asus's Republic of Gamers (ROG) brand has produced some pretty impressive laptops, desktops and gaming peripherals. However, the ROG G20 is by far one of the most amazing looking products it's come up with.

The Asus ROG G20 is essentially a gaming desktop, with off-the-shelf PC parts shoehorned into a console-sized, futuristic-looking case. It's a small-form-factor system that sits vertically with a uniquely designed chassis and a subtle selection of LEDs.



▲ The design and style of the Asus ROG G20 is quite impressive



▲ The external PSU is an odd design decision, but it works well enough



▲ Somehow Asus managed to cram a gaming powerhouse PC in here

It's an extraordinary looking PC, with two shell-like black plastic sections joining together over a red centre section. The LEDs are placed at the front of the unit, under the patterned outer shells, and from underneath the G20, which gives a more alien-looking theme to the desktop.

Inside, it's a different story. Somehow Asus has managed to squeeze in a 3.4GHz Intel i7-6700, with 16GB of 2133MHz DDR4 memory, a 128GB Samsung 850 EVO SSD with Windows 10 and a further Toshiba 2TB hard drive.

In addition to that, and quite amazingly, the company has also included a full-sized Nvidia GTX970 with 4GB of memory. This is placed in its own bracket and takes up most of one of the side clam-like sections, with the rear I/O ports located at the back of the G20 toward the bottom of the unit. Surprisingly, there's enough room inside for a laptop-style cooling solution over the CPU and motherboard that channels the heat away from both the processor and the excess from the GPU up through the top vents of the G20.

Other hardware and connectivity includes 802.11ac wi-fi, a pair of front USB 3.0

ports, a slimline DVD/RW optical drive, two more USB 3.0 ports at the rear with a pair of USB 3.1 and USB 2.0 ports, a six-port audio block, HDMI, three DisplaPorts and DVI via the GTX970.

In terms of performance, the G20 managed to score a pretty impressive 13,631 in 3DMark 11, which in real-world terms means it'll happily play the latest triple-A titles at the maximum settings at 1080p.

While the design of the Asus ROG G20 is splendid, there is an odd element thrown into the mix. Asus has decided that to keep the dimensions as discrete as possible and without ruining the aesthetics of the case, an external power supply was necessary. However, this isn't any ordinary external power brick. It's actually made up of two separate power supplies: one at 180W, the other at 230W, each with its own kettle lead power cord.

The thinking behind this is simple enough: the G20 is a high-spec PC and requires a fair amount of power. One of the PSUs is dedicated to the GPU, whereas the other provides power to the rest of the system – or at least we think it does. The draw appears to be

balanced between the two, which keeps things working while minimising the heat generated within the case. It's a strange setup, with its Asus ROG custom housing for both PSUs, but it works – despite using up two plugs in the process.

The Asus ROG G20 is definitely one of the most interesting gaming PCs we've ever tested, but it's also one of the most enjoyable and fun. Yes, it has an odd PSU setup and it looks absolutely crazy, but we can't help liking it.

It does, however, come at a higher than average price, £1,300 to be exact. Because of the style and specification, though, it's an extraordinary gaming PC.

mm David Hayward

An expensive, but impressive gaming PC



AVG PC TuneUp v16.22

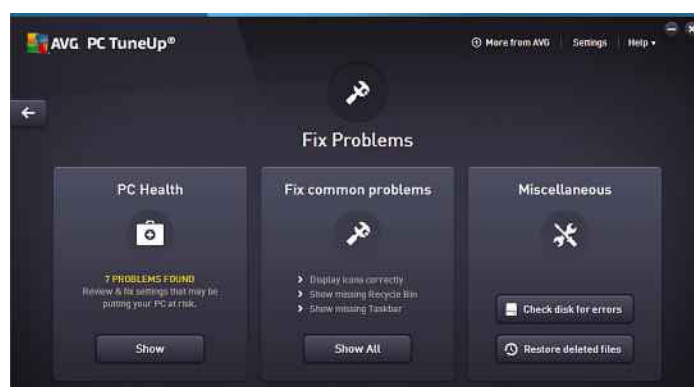
Roland Waddilove blows away the cobwebs on his system with this handy tool

DETAILS

- Price: £24.99 a year, £39.99 for two years
- Manufacturer: AVG
- Website: www.avg.com
- Requirements: Windows XP or later, 1GB RAM, 1GHz processor, 160MB disk space



▲ The smart new interface is one of the best around and is very easy to use



▲ Fix problems with the PC, clear out junk and customise the Windows interface

AVG PC TuneUp is a collection of over 30 functions that can be used to tune up, clean up, repair and optimise your computer, whether you're still running Windows XP or the latest version of Windows 10. It is an impressive and comprehensive toolkit.

Instead of bringing out new products once a year, AVG has switched to continual updates. New features and tweaks are regularly added, and the latest version is pushed out as soon as it's ready. This is like the way Microsoft has made Windows 10 the last, and instead of new versions, it will continually update the current one. The version of AVG PC TuneUp on

test is 16.22.1.58906, but by the time you read this, it could be different.

The home screen provides five tiles, which are used to access Maintenance, Speed Up, Free Up Space, Fix Problems and All Functions. That last item displays a list of the 30-odd functions that PC TuneUp provides. The home screen tiles are used to run combinations of these. Maintenance, for example, checks for registry problems, broken shortcuts, system caches and logs, browser data, start-up and shutdown issues, and disk fragmentation. A single Fix & Clean button enables you to clean up and tune up, but expert users can view the details and individually select or deselect items to be fixed or cleaned.

This one-click maintenance can be run on a schedule, such as every three days, every week and so on, or whenever the PC is idle. There's also a Live Optimisation feature that monitors the system and optimises start-up and increases the response of applications. A Program Deactivator automatically closes programs running in the background when you quit them, and this will release extra memory.

Four different computer modes can be selected on the home screen: Economy, Standard, Turbo and Flight. Economy mode makes changes to the system to maximise battery life when used with a laptop. There are maximum and moderate energy saving settings, and manual

configuration that lets you select what to turn off or leave on. Turbo mode is useful for playing games or using applications that require a lot of processing power. There are over a dozen configurable options that turn off non-essential features and put off maintenance tasks.

Among the functions is AVG Styler, which enables Windows 7 users to customise the login screen, and alternative designs can be downloaded from the AVG website. System icons can be changed, icon spacing on the desktop can be adjusted, and shortcut arrows removed. An Uninstall Manager can be used to remove software you no longer need, and it displays usefulness ratings for each program and when they were last used, which are helpful when deciding what to keep or remove. There are tools to find large files and duplicate files, which you can then delete to free up disk space. Caches and logs can be cleaned, and there's a secure file eraser.

AVG PC TuneUp looks great and has lots of tools for tuning, cleaning, optimising and tweaking windows. The downside is the £24.99 annual fee, although this does include constant updates.

mm Roland Waddilove

Great, but a one-off fee would be better



Asus 970 Pro Gaming/Aura

Asus reminds us all that AMD's desktop CPU technology is overdue for replacement

DETAILS

- Price: £100.06
- Manufacturer: Asus
- Website: uk.asus.com/
- Requirements: AMD AM3+ FX/Phenom II/Athlon II/Sempron 100 Series processors, DDR3 RAM

For those people who like AMD's desktop chips, the drought of new products in this sector has lasted very long indeed.

Checking back, I first reviewed the Asus M5A970 Evo AM3+ motherboard in 2011. And now in 2016, Asus has sent me another motherboard based on the identical chipset and socket. That's nearly five years later!

That it's done this does actually suggest that a market still exists for those wedded to the AMD FX series, which always represented a great price/performance deal.

What this chipset needs is a revamp, but while we wait for that, Asus has endeavoured to enhance the 970 chipset in its Pro Gaming/Aura in many subtle ways.

But before we go there, how can the AMD 970 chipset (in reality the 870...) and its SB950 buddy perform when tested these days?

What's rather disconcerting is that this is still a decent performer when coupled with a 8 or 9 series FX processor, and there's more than enough grunt to run games if you combine it with an effective AMD or Nvidia video card.

These processors don't have an integral GPU, so a video card is a necessity, as

is DDR3 RAM and the usual complement of SATA drives.

The AMD 970 + SB950 might be 'old school', but it works quite effectively in terms of the performance and functions that PCs were meant to deliver five or more years ago.

Where it shows its age, though, is with the I/O services, because the 970 chipset predates USB 3.0 and lots of other advances that we now generally take for granted.

To make up for these limitations, Asus has splashed

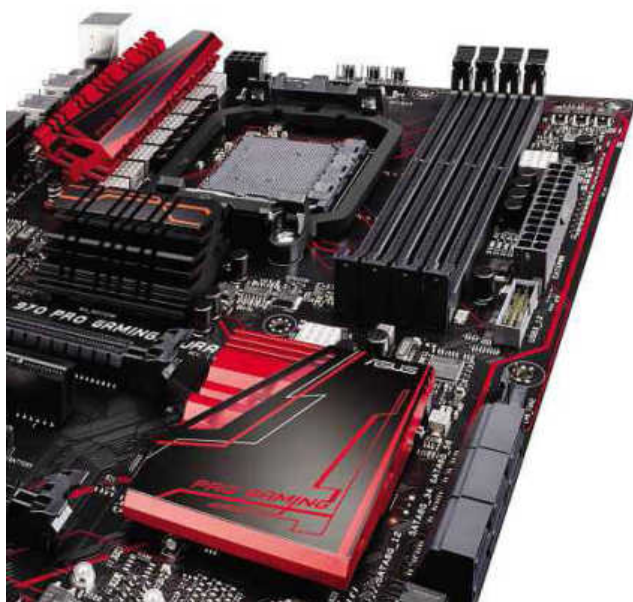
all manner of discrete silicon on it, all with the intention of bringing the 970 Pro Gaming Aura up to modern spec.

It's added no less than two ASMedia chips, one to support a pair of USB 3.1 Type-A ports (red ones) on the rear, and another to provide two USB 3.0 ports via a 20-pin header. More would have been nice, but you do get eight 2.0 ports on the back without the need to deploy a single header.

This board is, unless I'm mistaken, the only officially approved Nvidia SLI implementation on an AMD platform. Yes, it might technically work on others, but this one is actually certified to function.

There are two PCIe 2.0 x16 slots that operate in 8x/8x in multi-GPU mode, a couple of





x1 ports, and a pair of legacy PCI for those who need them.

So where is this motherboard not up to specification? There are a few things about it that I'm not thrilled about, the first of which is where it decided to place the LEDs for the Aura effects.

They're under the heatsink for the 970 chipset, which is lined up with the first 16x slot

and therefore where a big video card will mostly obscure it. Considering the time Asus spent on these lights and the ways you can control them, you'd think someone might have noticed this blatant design flaw.

There's also a LED track running from the Supreme FX chip along the cart slot edge of the board. This is red, and only red, regardless of what

colours you've selected on the Aura cluster. This doesn't seem like joined-up thinking, which is unusual for Asus.

Some might consider the lack of PCIe 3.0 a problem, but numerous tests have revealed that on a single GPU PCIe 3.0 or 2.0, it makes very little difference to performance. Yet it might have implications for the M.2 slot.

This is rated at PCIe 2.0 x4, providing a maximum bandwidth of 2GB/s. I've already tested PCIe M.2 SSDs from Samsung that can achieve 2.5GB/s read speeds, but only over a PCIe 3.0 x4 connection. This won't affect those who use SATA M.2 cards on this interface, but it could hold back a Samsung 950 Pro M.2 or similar.

Generally, I liked the Asus 970 Pro Gaming/Aura, as it reminded me that AMD can design some solid platforms, even if it's a bit useless at following them up or marketing them as effectively as Intel.

For those heavily invested in an AMD FX processor and DDR3 RAM, this board gives them a system revamp at

minimal cost, so they can enjoy at least a feature flavour of what a modern motherboard has to offer. In most respects this works, even if I'm less convinced by the lighting aspects than some might be.

And until AMD delivers its next-generation desktop CPU 'Zen' at some point this year, boards like this one are the only option without going Intel.

Nice board, an affordable price, great features and a bag full of nostalgia thrown in for good measure. [mm](#)
Mark Pickavance

Old AMD technology dragged kicking by Asus to 2016



Treehouse

How much coding ability can you learn from this online learning resource

DETAILS

- Price: \$25 per month, \$49 per month for Pro
- Manufacturer: Treehouse
- Website: teamtreehouse.com

For what is not the first time in my life, I've recently been attempting to learn how to code. I've dabbled briefly with this before, once when I attempted to make a game in Basic and another time when I thought I might have a crack at Java. Both times, I eventually came unstuck when I had to wrap my head around 'for loops', and I gave up.

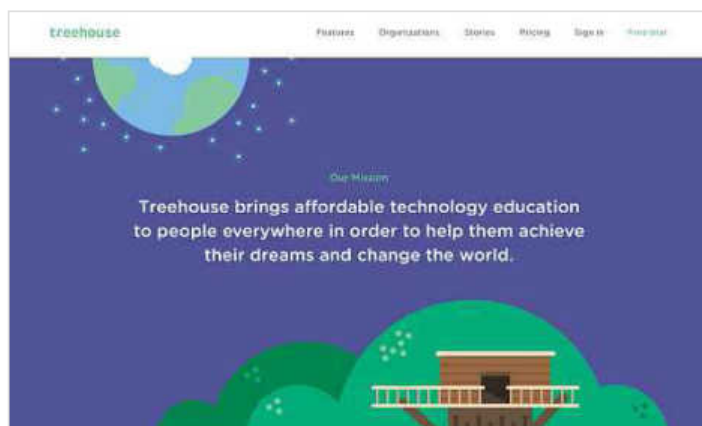
But also on both occasions, I was trying to teach myself using free tutorials online. Such information can be useful, but the help of a real teacher is invaluable.

Unfortunately, I'm not in a position to sign up to a full-time course, but I still want to broaden

my digital skills. Thankfully, I found a way to do just that online, and although I don't get a personal tutor, I do get to watch high-quality video tutorials, which I can follow in an interactive online environment. And if I get into any difficulty, there's an active online community who will help me.

So who's providing all this? Treehouse (teamtreehouse.com). Set up and run by Ryan Carson, a computer science graduate and entrepreneur, Treehouse has been going since 2011, and its content and the community around it has grown ever since.

Treehouse provides an online source of learning for anyone who wants to take up a technology-related subject. It offers a wide range of course, including web design and programming. Within these disciplines, just about every subject you can think of is covered to some degree: CSS, HTML, JavaScript, Ruby, Flask and so on. If you want, you can just dip in where you like by



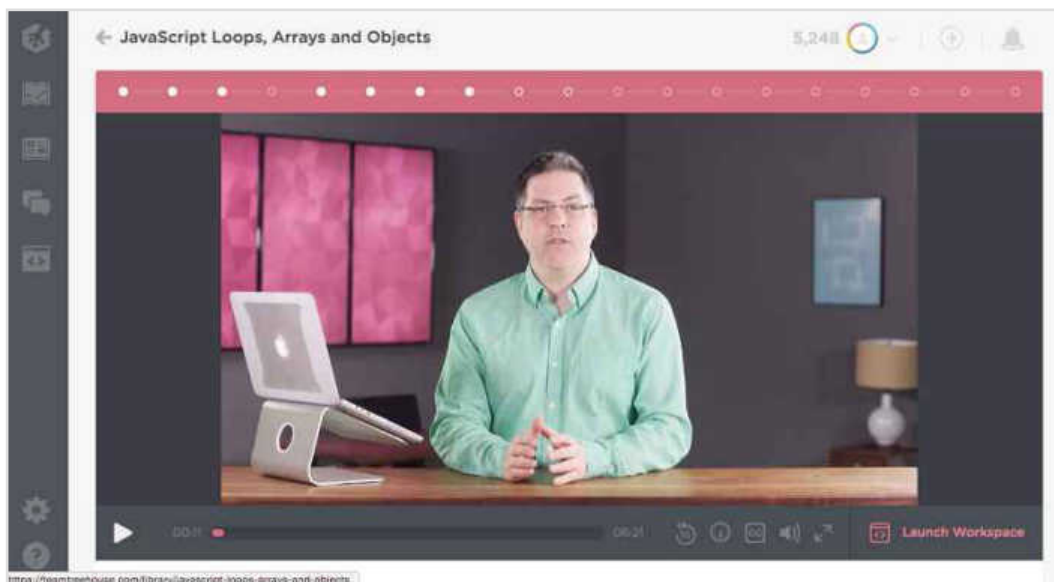
▲ The layout of the Treehouse website is simple, yet pleasing on the eye

searching for a subject, but Treehouse has also helpfully put together what it calls 'Tracks'. These are predefined collections of tutorials, designed to help you learn and eventually master a particular role. For the sake of this review, I skipped the Digital Literacy track (which covers the kind of thing most Micro Mart readers would already know anyway), and went straight to Web Design, after which I started the Front End Web Development Track.

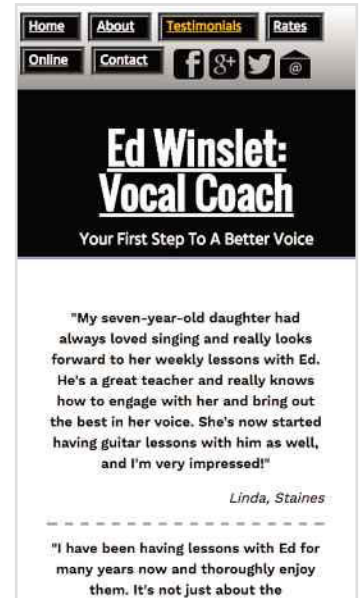
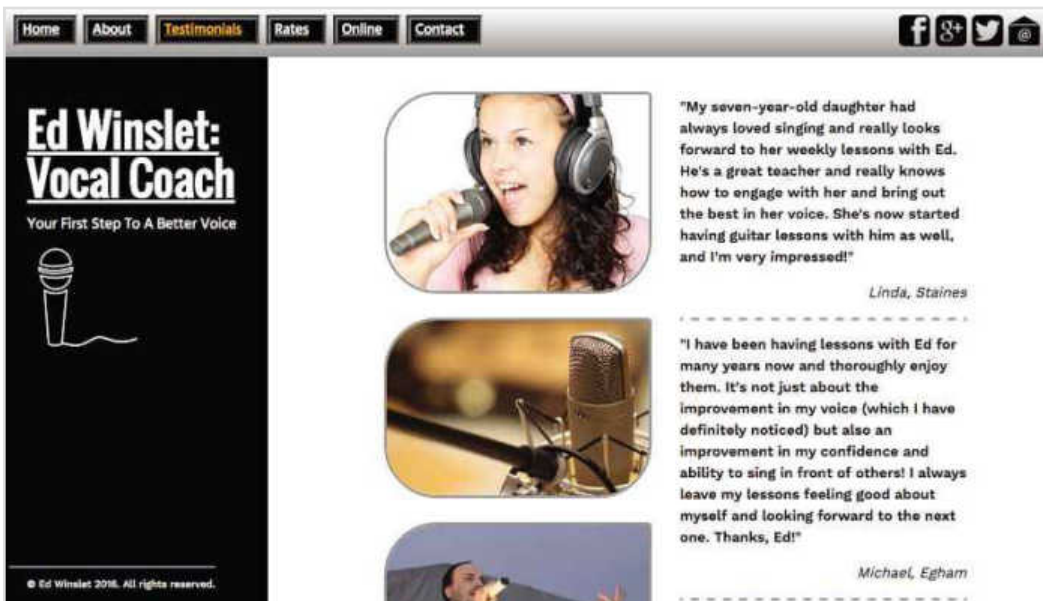
I also opted for the Basic plan, which costs \$25 per month after a free seven-day trial. This grants you access to more than 1,000 videos, the ability to use the live Workspaces engine to practise and follow along with, and access to the members only forum. For \$49 a month, you get all that, plus bonus content, access to talks with industry leaders and the ability to download video to watch offline.

The videos themselves are produced to a high standard, with good production values. Naturally, the abilities of the teachers vary, but they're all knowledgeable and informative. Also, the quality of the videos is good enough that you can see everything that's going on, so you can follow along.

And following along is made easy, thanks to the Workspaces feature. At the bottom right of almost every video, there's a 'Launch Workspace' button. Click this, and another browser window opens. This window acts like an advanced text editor, in which you can enter code and then run it. In fact, you can create a whole website right here, because it allows you to create folders and files, and also upload files, including images.



▲ A lesson from Dave McFarland, one of the teachers at Treehouse



▲ A simple website created using knowledge gained from Treehouse. The image on the right demonstrates how the same page would look on a mobile device

Close the Workspace and your progress is saved. And if you want to create a new Workspace, you can, saving the old one for later. Also, many videos include a new Workspace, which will be ready to use with that particular tutorial.

Once you've finished a lesson, you'll get an encouraging message, and you can click on to the next tutorial. Frequently, you'll find there's a quiz or a challenge between videos, which will test you on what you've just learned. You can skip these if you like, but it's recommended that you complete them, for obvious reasons. If you're anything like me, though, you'll enjoy these bits as much as the videos anyway.

As you progress, you're given points and achievements. Whether or not such gamification appeals to you is a matter of personal preference. Personally, I don't care about such things, but no doubt this helps motivate some people to learn. It also encourages them

to take part in the forum, where they'll gain extra points for upvoted posts and 'best answers'. That's of particular importance, because if you get stuck on something, it's often the community that will come to your rescue.

Clearly, then, there's much to like about Treehouse, but can it really teach you to code? Maybe. In my case, I managed to put together a reasonable looking website in the space of about two weeks, using nothing but HTML and CSS (no templates or content management systems). This site wasn't hugely advanced, but it was responsive, altering its layout according to the screen size of the device it was viewed on. I also learned a few things about Adobe Photoshop and Illustrator that I didn't know before.

After tackling the Web Design track, I began the Front End Web Development track. A good deal of the tutorials here were the same as the Web Design course, so I skipped

those and moved on to the JavaScript material. Currently, I'm still working my way through this, having got as far as producing some simple online interactions and a rudimentary web quiz. At times, it's been difficult, as you'd expect, but at no point has it felt overwhelming, thanks to the way things slowly build throughout the course.

There's still a long way to go before I can produce anything more complicated, but so far, I've been pleased with my investment in the Treehouse service. The website is clearly laid out, the teachers are all experts in their respective fields and I've learned far more than I ever did with free alternatives.

Of course, for some people free resources are perfectly adequate, but if you've tried them before and failed, then I'd recommend signing up for the Treehouse trial. It might not be able to replace a full-time course with a recognised qualification, but it could lead

to something if you do well and create a decent portfolio.

If I have one small criticism, it's that the Pro account doesn't seem to offer that much extra considering the price difference. Ultimately, though, you don't need to pay for that, unless you really want to go the extra mile.

Either way, you really have nothing to lose other than time and a relatively small amount of cash.

mm Anthony Enticknap

A high-quality learning resource



Asus Transformer Book Flip TP200SA

A notebook/tablet that's 'flipping' good

DETAILS

- Price: £250
- Manufacturer: Asus
- Website: g.co/gsdWXz
- Requirements: Windows/Microsoft account, mini-HDMI for output to external screen

The 12" touchscreen laptop market is quite a busy place to get into these days. The likes of HP, Lenovo, Toshiba, Acer and Dell are all there, with each company pitching its own particular brand.

Asus, therefore, has to come up with something special to compete and make its mark. Well, it may have done so with the Transformer Book Flip TP200SA.

Powered by a 1.6GHz Intel Celeron N3050 processor (2.16GHz turbo burst clock speed), the Flip TP200SA comes with 2GB of DDR3L 1600MHz memory and 32GB of eMMC flash storage and Windows 10 64-bit Home Edition.

Connectivity is good for a notebook of this size, with one USB 3.0 port, one USB 2.0 port, one USB 3.1 Type-C Gen1, a micro-SD card reader, micro HDMI, 802.11ac wireless and Bluetooth 4.1. It's a decent, and welcome, amount to pile into a notebook that measures only 297 x 201 x 18.4mm.

The design of the Flip TP200SA is good too. The sleek-looking metallic chassis and keyboard section is certainly very stylish, but it's also solid and doesn't flex when manhandled. The bottom of the notebook is black plastic, which gives it a slightly cheaper feel, but it keeps the weight down, and it's sturdy enough.



▲ The style and design of the Asus Transformer Book Flip is eye-catching, and the performance is good too



▲ The screen 'flips' over on to the back of the keyboard section in a smooth, solid motion

With the battery the Flip TP200SA weighs 1.2kg. That's not a bad weight to have to carry around with you, but as the name of the notebook suggests, the Flip's screen can open 360° to become a tablet. When in tablet mode, 1.2kg isn't too heavy, and due to its dimensions, it's quite slim as well. After a while of holding it, though, especially in

one hand, it'll prove much heavier than a dedicated tablet.

The engineering, however, with regards to the flip movement, is excellent. There's a long hinge section taking up most of the joint between the keyboard and the screen elements, which makes for a solid 'feel' when turning it to and from notebook and tablet modes. It's

far better than some double-hinge models we've used in the past, at least.

The performance of the Flip is good. Windows 10 works well with the touchpad gestures, proving responsive and useful. The extra speed from the processor does a good job of keeping up with the usual office-based tasks and even a spot of (very) lightweight gaming from the Windows Store. As long as you don't expect too much from the Flip, it'll work with you quite happily.

As for the battery, we managed a tad over six and a half hours of normal use (browsing, using a word processor, listening to music, etc.), before we needed to plug it back in again. All this was while the screen was at full brightness levels too, so it's more than enough to last the average commute.

Priced at around £250, the Asus Transformer Book Flip TP200SA is a good choice of modern notebook/tablet. It has enough performance for most users, looks good and is well constructed, and it's capable of lasting most of the working day off a full charge.

mm David Hayward

A great notepad/tablet that works well



Varidesk Pro Plus 36

To sit or stand is the question raised by a computer workstation

DETAILS

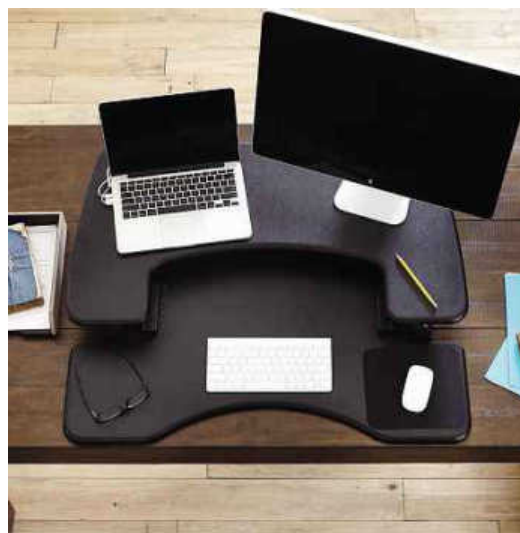
- Price: £335.00
- Manufacturer: Varidesk
- Website: www.uk.varidesk.com
- Requirements: n.a.

I must confess to having some feelings of sympathy as I saw the courier struggling to carry a package to my front door. This initial thought was quickly followed by those of apprehension as I realised I would have to manhandle this product as part of its review process. The package in question contained the Varidesk Pro Plus 36, which is a height-adjustable desk allowing you to switch between a seated and standing position when working on a computer.

Designed to support equipment up to a weight of 35lbs, this Varidesk product is heavy enough for the company to recommend that the unpacking and setting up of the product should be a two-person task. The need for two people to be involved is clearly indicated on the product's packaging. I can certainly agree with this, because even moving the box from my hallway to the computer area was a task calling for two people.

Prior to using the Varidesk, you will need to clear away an area on your current work space. The Varidesk Pro Plus 36 requires enough space to accommodate its footprint of 61 x 75mm (W x D).

The Varidesk unit consists of two platforms mounted on a base unit made up of two



elongated metal feet that are connected together by metal slats. Circular pads on the underside of the metal feet help provide some protection for the surface on which this adjustable desk will sit. Pressure handles, located on either side of the Varidesk, need to be depressed to activate the unit's spring-loaded mechanism, which raises the two platforms providing the space on which to position the components making up the computer system.

Both of the platforms have been designed to incorporate cut-out sections at the front. While the cut-out section on the top platform is rectangular in shape, the lower platform has a more curved shape suitable for moving in close.

Varidesk claims that the top platform, with its width of 88cm, is capable of handling two monitors positioned side-by-side. However these monitors would need to be of a size less than 23 inches in order to fit comfortably. There was

just about enough room on this platform for my 27" monitor sandwiched between my Yamaha speakers.

The lower platform is slightly wider at 90cm. Extending outwards, it provides areas where you can position your collection of peripherals. In my case, this platform became home to a keyboard, mouse, A4 flatbed scanner and a modem-router. My tower system box remained on the floor beneath the more traditional style of desk supporting the Varidesk unit.

No matter how careful you are, the various leads attached to the computer components can become entangled, and this is certainly true with the Varidesk Pro Plus 36. Included with this product is a pack of five cable management tags. These tags are especially useful in ensuring that the various leads are not positioned where they could become trapped within the mechanism used to raise and lower the Varidesk.

There's a 33cm difference

between the height of the Varidesk Pro Plus 36. Raising the height is just a matter of simultaneously holding down the two pressure handles. Lowering the height is trickier, because you need to hold down the handles while applying downward pressure.

Ultimately, it's useful but more suited to an office rather than a home environment.

mm Michael Fereday

A decent way to work



GROUP TEST

Wireless Hard Drives

External hard drives are a great way to take all your files around with you, but they're useless if you don't have the cable to hook them up to your PC.

With wireless drives, that's no longer a problem. And not only that – they also make it easier to share your files with multiple devices and computers.

David Hayward has been looking at a few wi-fi drives this week, and finding out which ones are most worthy of your time and money.

Wireless Hard Drives

Buffalo 500GB MiniStation Air Mobile

DETAILS

- Price: £55
- Manufacturer: Buffalo
- Website: goo.gl/8XLmg4
- Requirements: Spare USB port, 802.11b/g/n wireless, Android or iOS device for app

The Buffalo MiniStation range has been around for a few years now, and was designed to use wi-fi as a way of extending the storage capacity of phones and tablets. As far as capacities go, there's only a single 500GB version available. That's not bad, considering it's wireless storage, but 500GB can easily be consumed these days.

However, where the capacity may seem low, the Buffalo MiniStation has a few tricks up its sleeve.

Before we get that, though, let's look at the physical appearance of the MiniStation Air. It's a 84 x 23 x 130mm size drive encased in a black plastic shell with silver/grey sides and a selection of LED on top indicating wi-fi activity, power and so on.

The rear of the device houses a USB 3.0 type-B micro port. There's also a power port next to the USB port, which can act as a secondary charging port, since the internal battery of the MiniStation can be charged via the USB connection. It's an option if you have the drive tucked away somewhere and permanently plugged in.

On one side of the drive, there's a power button accompanied by an AOSS button, which is Buffalo's AirStation One-Touch Secure System technology that allows a secure wireless connection. The MiniStation offers 802.11n wi-fi, and when

powered up, it will broadcast its own wireless network, using the SSD printed on the unit itself.

To get the most from the drive, you use the mobile app, available for both Android and iOS. The app allows you to play a variety of media and save files to and from your device to the MiniStation Air. There's even a wi-fi pass-through feature that can allow your device to still access the internet while connected to the MiniStation Air. Oddly, though, music and images are handled by the app, but videos are left to play through the device's default video player.

Sadly, there seems to be no Windows version of the app, so you wouldn't be able to use the MiniStation Air as a wireless device from within Windows. You can, however, plug it in via the USB cable, but then that defeats the object of it being wireless.

In terms of performance, the Buffalo MiniStation Air managed write speeds of 67MB/s over USB 3.0 and read speeds of 102MB/s. Wi-fi speeds were obviously much slower: 750KB/s while

writing and 5MB/s while second reading. But the MiniStation remained stable throughout the transfers, and we did enjoy HD playback from a couple of devices without any problems.

The drive within comes formatted to FAT32, so you'll need to reformat it to NTFS or something if you want to store files larger than 4GB. Thankfully, that's not much of an issue, as it's recognised as a removable drive when connected to Windows.

For around £55, the Buffalo 500GB MiniStation Air Mobile is an okay wireless hard drive. Although it's not fast, it's solid, stable and will certainly help you if you use it with your mobile devices.



Seagate 2TB Wireless Plus Hard Drive

DETAILS

- Price: £169
- Manufacturer: Seagate
- Website: goo.gl/4d0PFd
- Requirements: Spare USB port, 802.11n wireless, Android or iOS device for app

The Seagate Wireless Plus hard drives come in three different capacities: 500GB, 1TB, and 2TB. It's the largest of the three that we have for review here.

The drive is housed in a steel/grey coloured and sturdy plastic case measuring 127 x 89 x 21mm and weighing around 270g. There are a couple of LEDs on the top indicating power and wi-fi connections, a set of four rubber feet on the bottom of the drive, and on one end a USB-B 3.0 connector and a power button.

The wi-fi is 802.11n, which is normally backwards compatible, but for some reason it wouldn't connect to our older devices. You'll need to log into its own wi-fi signal. The details are provided with the drive itself, and connection to it is extremely easy.

However, we didn't have much luck when it was actually connected via wi-fi. The drive only seemed to work while the pair were in line of sight. If we moved something in the way, the signal was lost instantly, so moving between rooms was out of the question, as was the idea of having this as a hub for multiple devices to communicate to throughout the house.



“ The drive only seemed to work while the pair were in line of sight ”

The USB connection, though, was a better solution, but it wasn't all good. This brings us to the second negative aspect of the Seagate Wireless Plus we came across. USB 3.0 transfer speeds were shockingly low, with a write speed of just 15MB/s and a read speed of 35MB/s. We're not quite sure what was going with the drive, but further testing proved to be just as bad.

As for the wi-fi speeds, we managed an equally poor 140KB/s write and a 2MB/s read speed.

The battery life wasn't really up to much either. We managed to get three quarters of the way through a film before the device died on us, which was roughly an hour and half. And while playing the media, the HD content stuttered significantly, indicating a poor connection to the device.



The Seagate Wireless Plus is capable of synchronising with your Dropbox and Google Drive accounts through the provided Seagate app. And there's also AirPlay and DLNA support built in, but since the transfer speeds we suffered were pretty dismal, we didn't record the stats of those features.

The Seagate 2TB Wireless Plus Hard Drive costs in the region of £169, which is pretty expensive. On the plus side, you do get a huge 2TB of space to play around with, but in our mind the negatives of our experience with it outweigh the positives. When you include the high cost, it just isn't worth it.

Wireless Hard Drives

WD My Passport Wireless 1TB

DETAILS

- Price: £130
- Manufacturer: Western Digital
- Website: goo.gl/tM9BDp
- Requirements: Spare USB port, 802.11n wireless, Android or iOS device for app

Coming in two capacities, the Western Digital My Passport Wireless drives offer the user a choice of either 1TB (which we have to review here) or 2TB.

This particular model offers something a little extra beyond what we've already looked at. In fact, it could well be the ultimate in wireless storage technology.

The WD My Passport Wireless comes in a rather chunky 86 x 127 x 24.4mm tough plastic case, with a black upper section and grey/silver sides. There's WD My Passport logo on the top, along with a couple of LEDs indicating power and wi-fi strength, and attached to this section is an SD card slot.

There's a standard USB 3.0 port on one end, with a power button and another button that also doubles up as a battery indicator and WPS connection.

Other features of the My Passport Wireless include DLNA; internet sharing, where the device acts as a wireless hub to share an internet connection with multiple clients; and a dual stream 802.11n (2x2), which will allow for a faster transfer speed over wireless.

The SD card element can be used to copy the entire contents of the SD card to the

hard drive, or you can log into the drive via the WD app and control the copying, as well as setting up the location where an auto-copy from the SD card will take place. This is certainly a handy feature to have in place, especially for the photographer, for example, who can quickly back up the

contents of the camera's card and access the contents wirelessly if needed.

In terms of performance, the WD My Passport Wireless was pretty good. While attached via the USB 3.0 port, it managed a healthy 95MB/s write, while the read speeds were an equally good 115MB/s.



The wi-fi speeds were strong too, with a write speed of 13MB/s and a read speed of 16MB/s – both of which are hitting the upper limit of the 802.11n 2x2 specification.

The WD My Passport Wireless 1TB hard drive is a stylish, tough device that offers much more than many drives. We especially liked the SD card functionality, and the WD apps for both iOS and Android, as well as the browser-based software for Windows, Mac and so on. The battery life was excellent too, with the HD content viewing lasting at least three and a quarter hours before we needed to plug it into the USB port for charging.

For around £130, the WD My Passport Wireless 1TB is a great portable and wireless hard drive with plenty of features and excellent connectivity and speeds available.

Toshiba Canvio Aerocast Wireless 1TB

DETAILS

- Price: £70
- Manufacturer: Toshiba
- Website: goo.gl/KvKMgw
- Requirements: Spare USB port, 802.11b/g/n wireless, Android or iOS device for app



Just when we thought that WD had the group test sewn up with the added SD card slot in its wireless hard drive, Toshiba comes along and drops another model with a built-in SD card slot.

The Toshiba Canvio Aerocast Wireless 1TB hard drive looks very much like the standard external drives of the old Buffalo days. It's encased in a toughened black plastic shell, with three LEDs on top to indicate the battery life, wireless and SD activity. At one end there's a power button and a USB type-B micro 3.0 port, and there's a pinhole reset button next to the SD card slot.

It's a fairly unassuming product, one that measures 124 x 86 x 20mm, but it does manage to pack in some of the better features we've already seen on the other

“ The only problem we had with the Canvio Aerocast was the battery life ”

devices available. For example, DLNA is supported, there are both iOS and Android apps available for management of the device; it'll act as a bridge, so when you're connected to it you can also connect to a wireless internet source to still allow you browse; and it supports 802.11n wireless.

The SD card element operates in much the same way as the WD My Passport wireless hard drive does. You

can opt to download the entire contents as soon as you plug in an SD card to a predefined folder location or you can choose different folders from within the app.

File transfers were good, although not on a par with the WD My Passport. The USB 3.0 write speed was 70MB/s, whereas the USB read speed was 105MB/s. The wireless speeds were a little slower too, with a write speed of 3MB/s and read speed of 5MB/s.

Although slower, you'll still be able to comfortably watch a HD film without any difficulties, and streaming music won't prove much of a problem either.

The only problem we had with the Toshiba Canvio Aerocast was the battery life. For some reason, off a full charge, we only managed to get just over an hour of content viewing before the drive required a charge again. The old issue with Toshiba

laptop batteries sprang to mind, but that obviously doesn't apply in this case.

Other than the poor battery on the model we tested (which could be due purely to our test model), the Toshiba Canvio Aerocast Wireless was an okay portable hard drive. Again the added SD card interface is a handy feature to have in place, and it worked well enough during its time with us – plus 1TB is a good amount of storage.

The Toshiba Canvio Aerocast 1TB model costs in the region of £70, which is nearly half the price of the WD My Passport. However, we'd recommend you test it first to see if the battery problem is present.



Wireless Hard Drives

SanDisk Connect Wireless Stick 128GB

DETAILS

- Price: £65
- Manufacturer: SanDisk
- Website: goo.gl/0wjc58
- Requirements: Spare USB port, 802.11n wireless, Android or iOS device for SanDisk Connect app

With capacities ranging from 16GB through to the newly released 200GB model, the SanDisk Connect Wireless Stick isn't going to be the first choice of storage for those who think a 500GB hard drive is a bit too small.

However, where the previously reviewed wireless hard drives all follow a certain design, SanDisk has produced something a little different. In essence, it's a wireless USB flash drive, but just because it doesn't have a higher capacity, doesn't mean it's not worthy of the other examples we have on test.

The Connect Wireless Stick measures just 20 x 78 x 12mm and weighs as little as 21g, and it looks like any other USB flash drive. There's a patterned top to the case, like a hologram, which adds a certain degree of aesthetic appeal, but other than that it's a simple plastic rectangle.

One end of the Connect terminates in a USB 2.0 connection, with a small power button on the side and an activity/power LED on the top. Additionally, there's a lanyard loop at the opposite end of the USB connection.

Connection to the Wireless Stick can be achieved through an Android or iOS app, through a web browser, or by



“ We managed to get around two hours before it died on us ”

plugging it into a handy USB port. Sadly there's no internet pass-through enabled on this device, so to access both it and the internet or the rest of your network, you'll need to first connect to the Stick then change its settings to join your network.

Also, it's worth mentioning that the wireless part of the Stick will only work when it's

not plugged into a USB port. Once plugged into a USB port, the wireless function stops, the drive starts to charge and you can access the file system as you would any other USB stick.

The performance of the SanDisk Connect Wireless Stick wasn't as good as what we've seen from the other devices, mostly due

to the fact that it's a USB 2.0 interface rather than the faster USB 3.0. We did manage a write speed of 13MB/s and a read speed of 26MB/s. The wireless option, with the Connect Stick offering only 802.11n, managed a write speed of 1.8MB/s and a read speed of 5MB/s. Not great, but still better than the Seagate drive.

The battery life is rated at four and a half hours, with continuous use. Watching a video from the drive wirelessly, we managed to get around two hours before it died on us. The annoying thing is you'll need to plug it in to recharge and thus lose the wireless signal.

The SanDisk Connect Wireless Stick 128GB version costs around £65, which is a lot considering you can get the Buffalo 500GB wireless drive for £55 and the Toshiba 1TB wireless drive for five pound more at £70.

It's a neat little device, we'll give it that. But ultimately it's a little too limited for anything other than quickly sharing a presentation or a few files.



LaCie Fuel 2TB

DETAILS

- Price: £179
- Manufacturer: LaCie/Seagate
- Website: goo.gl/pmv7wW
- Requirements: Spare USB port, 802.11b/g/n wireless, Android or iOS device for app

The Seagate wireless drive we have available for this group test didn't perform so well, so it was with a bit of trepidation that we unboxed the LaCie Fuel, since the company is owned by Seagate.

The LaCie Fuel comes in two capacities: 1TB and 2TB. Both share many features of the Seagate wireless drive, for obvious reasons. The only major visible difference is of course the design.

The LaCie Fuel looks very much like a CD caddy, one that measures 115 x 115 x 23mm and weighs just under 300g. It's a bit of a strange-looking device, with an orange coloured section cut out from one corner, USB 3.0 type-B micro port on one side, along with the power button, and a selection of LEDs indicating power, wireless and hard drive activity. In fact, it's supposed to resemble a jerrycan, hence the Fuel part of its name.

The internal features of the LaCie Fuel are identical to that of the Seagate Wireless Plus, but in this instance we found it to be a much stabler and quicker device.

In terms of performance, the Fuel's write speed was 90MB/s, and the read speed was 110MB/s when plugged



into the USB port. The wireless tests revealed a write speed of 5MB/s and a read speed of 8MB/s. These are good enough speeds and certainly much better than the Seagate Wireless Plus managed.

The Fuel creates its own 802.11n wireless network for you to attach to up to five devices to. We only managed to connect three devices, but all managed to play the test content well enough without any visible lag. Incidentally,

the Fuel also has an internet pass-through feature to allow devices to access the internet while still connected to the wireless signal of the Fuel.

The battery is stated to last for at least ten hours off a full charge. In our tests, though, it managed four hours before it bit the dust. It's short of the ten-hour claim, but it's still the longest lasting drive out of the entire group.

The only major downside of the LaCie Fuel 2Tb is the price. The £179 price is a little

steep for a 2TB external hard drive, but considering this is a wireless device and that the lesser performing Seagate model costs around ten pound less, it's not too bad.

The LaCie Fuel is a great wireless, portable hard drive. It performs well, looks odd but also good at the same time, and the battery life is the best we've come across.





WD My Passport Wireless 1TB

The WD My Passport Wireless 1TB, we think, offered the best balance of performance, price, stability and capacity out of the group.

It's a great drive, with loads of features, and we especially liked the SD card slot.



LaCie Fuel 2TB

The LaCie Fuel is our runner-up this week. It offers a great 2TB of capacity, interesting looks and style, and decent performance and features.

How We Tested

Each drive was connected via USB to a laptop with an i5-4790, 4GB of memory and Windows 10 installed, and a 4GB file was transferred to test the read and write speeds. For the wireless portion, each drive was connected to a Samsung Note 4 and an Asus ZenPad. We used ES File Explorer to transfer the 4GB file to measure the read and write speed.

	Buffalo 500GB MiniStation Air Mobile	Seagate 2TB Wireless Plus Hard Drive	WD My Passport Wireless 1TB	Toshiba Canvio Aerocast 1TB	SanDisk Connect Wireless Stick 128GB	LaCie Fuel 2TB
Price	£55	£169	£130	£70	£65	£179
Dimensions	130 x 84 x 23mm	127 x 89 x 21mm	127 x 86 x 24.4mm	124 x 86 x 20mm	78 x 20 x 12mm	115 x 115 x 23mm
Weight	285g	272g	280g	260g	21g	300g
USB type	USB 3.0	USB 3.0	USB 3.0	USB 3.0	USB 2.0	USB 3.0
Wi-fi Type	802.11b/g/n	802.11n	802.11n (2x2)	802.11b/g/n	802.11n	802.11b/g/n
Battery Life	2.5 hours	1.5 hours	3.25 hours	1.1 hours	2 hours	4 hours

Top 5

Ways To Waste Your Time Online

How to get caught in the sticky web of online distractions...

1 Wikipedia

In spite of its potential for inaccuracy, Wikipedia is generally a pretty good source of information. So how can it be a waste of time if you're learning something? Well, the problem is even if you visit the site to look up something relevant to your current work, it's almost impossible not to end up following link after link after link – until eventually, you've strayed a proverbial mile from where you started. Then you look at the clock and realise you've lost over an hour, and you've no work at all.

2 IMDb

As with Wikipedia, IMDb draws you in and then steals your time with all its tempting links. The main difference is what brings you there in the first place. Most of the time, you end up on the site after watching a TV show or movie and seeing a familiar actor who you can't quite place. And after finding out that yes, that actor was in *Neighbours*, you might as well look up the guy who played Harold Bishop, and then why not see what else he's done... Will any of this information be useful to you later (except maybe in a pub quiz)? Of course not.

3 Facebook

So, you've just found out that Ian Smith, the chap who played Harold Bishop, was also in *Prisoner: Cell Block H*. That's the kind of factoid you can't simply keep to yourself. And if there's no one else in the immediate vicinity, then Facebook gives you a quick and easy way to pass on what you've just learned. If only there weren't so many other distractions there, like pictures of your friends and family, and the weird and funny things they've posted on their Facebook timelines. Plus there's always the chance someone posts something that you feel strongly about, in which case, you're likely to end up wasting hours in a Facebook 'discussion' that ultimately goes nowhere.

4 Gaming

Even if you're not a gamer, there's still a chance you can get hooked into an online game. But rather than playing the latest *Call of Duty* or *World of Warcraft* expansion, it's the silly little browser games that are the problem. Why it's so important that you fling a cartoon penguin further than some random people on the internet, we're not sure, but it just is. And once you've broken the current record, you can always go on to Facebook to tell all your friends about it.

5 Window Shopping

You might be completely broke, but there's still something oddly therapeutic about filling a virtual shopping basket with things you can't afford. The idea of window shopping isn't something new, of course, since people used to do it with actual shop windows, peering through the glass at the fancy things inside. But these days, it's so much easier. And if you're not careful, in the spur of the moment, you could end up buying that hugely expensive gaming laptop or whatever, which is fine until you realise it means not eating for a few months.



▲ Four hours later, he hadn't done any work, but he was well on his way to becoming an expert on the Chuckle Brothers



When Cable Comes To Town

**Virgin Media has been visiting our
writer's village. He's not happy**

You will have heard the phrase “long-term economic plan” a lot over the past few years. It’s become synonymous with pretty much any session of Prime Minister’s Questions that I can remember, and it’s clearly a phrase that David Cameron has been keen to bring up at any opportunity.

The Conservative Party website even has a web page dedicated to setting out its long-term economic plan. It includes reducing the deficit, delivering the best schools and skills for young people and creating more jobs, in part by providing a solid infrastructure to do so. That last point is where this story begins: the story of how Virgin Media came to my village and didn’t leave for three months.

Broadband Britain

In order to create the right, forward-thinking digital infrastructure to help create more jobs and develop a stronger economy, common thinking is that you need the right broadband infrastructure in place. It’s an area that the government, along with backing from BT Openreach and Virgin Media, has been keen to push on the nation. Regulator Ofcom has also talked up the UK’s internet economy as “one of the strongest in the world”.

Given our collective dependence on the web, it makes perfect sense that consumers, including me, should want access to the best broadband services possible. I’m certainly not going to argue against wanting a solid, speedy web connection. As a home-based freelance writer, I’m absolutely dependent on the reliability of my web connection, and my family, like me, has become increasingly tied to entertainment services provided by the internet. Netflix, online gaming, web-based mathematics platforms, Skype calls to grandparents, and Sonos. These are a few of the many things in our daily routines that depend on a strong, reasonably fast internet connection. As for my business, I need reliable web connectivity every single day or else I lose out on work, so I haven’t set out to argue against the need for better broadband. Perhaps David Cameron put it better than me when he spoke of Virgin Media’s announcement last year of its investment in the UK’s broadband infrastructure: “I welcome this substantial investment from Virgin Media, which is a vote of confidence in our long-term economic plan to support business and create jobs by building a superfast nation backed by world-class infrastructure.” Then again, perhaps not.

In actual fact, what the Prime Minister has done here is what much of politics is about – namely, spinning a positive news story to a political party’s advantage. In this case, the government used Virgin Media’s investment in its fibre broadband network to prove that its own economic plan is working. This is a prime example of just what turns so many of us away from politics in the first place. And that, you may be glad to read, is the last time I’m going to write about politics in this article.

As for Virgin Media, just what has it invested in?

Thunder And Lightning

Over a year ago, in February 2015, Virgin Media announced the “largest investment in UK’s internet infrastructure for more than a decade”. Dubbed Project Lightning, the company was promising to extend its “unrivalled fibre-rich network” to around four million additional premises over the next five years, ultimately increasing the company’s UK reach so it can provide services to nearly 17 million premises by 2020. It also said that it was putting in £3bn of private investment to help fund the project.

For Virgin Media, this represented a major coup, as it’s the only major rival in terms of infrastructure to BT Openreach, which provides the vast bulk of the UK’s broadband providers with the fixed infrastructure they need to supply us with our services. Virgin Media isn’t shy about its alternative offer to BT. On the contrary, it’s positively boastful of its “always faster” service in comparison to its direct competitor and how customers signing up to its infrastructure will benefit from speeds that are “at least twice as fast” as BT’s. With Virgin Media’s promised ‘up to 200Mbps’ service, customers actually reaching those speeds would indeed be benefitting from the fastest broadband around.

In its press release on the initiative, Virgin Media wrote of how home workers and small and medium-sized companies would also receive a boost from better connectivity, and of its “long-term investment in speed leadership”. The company has every right to be proud of its investment.

The failure to split Openreach from BT and a general lack of competition in the digital market are bugbears for those

“ After the trench is dug and the cable laid, fresh tarmac is poured into the trench to cover it up again ”

criticising the UK’s broadband industry. Ofcom has recently called on Openreach to open up its networks of telegraph poles and underground tunnels for competitors to be able to install their own fibre networks, but it didn’t call for Openreach to be split from BT. With this in mind, it’s important to recognise that Virgin Media should be welcomed for providing a genuine alternative to Openreach.

That’s the background. Ten months after Virgin Media’s announcement, some road signs appeared in my own village, informing residents that work was to begin in the area and that we were thanked for our patience.

Three months on, the signs are still there.

The True Cost Of Progress

I was quite surprised when the signs first appeared. I had received no letters from Virgin Media informing me that my village had been chosen as the next in the company’s project rollout. Residents I have spoken to hadn’t received any correspondence either. There were no visits to households canvassing for my opinion on whether I actually wanted Virgin Media’s services and, furthermore, no letters once work had started to let me know how long the works might be going on for, no apologies for any upheaval and so on.

I contacted Virgin Media, which told me “We notify residents in a number of ways”, through leaflets, local media and also through the local council. “Its unfortunate that you’ve not seen any of these.” Unfortunate indeed. Providing this kind of information in local media is one form of communication but only effective if you actually read the local paper. Personally, I believe that you shouldn’t have to seek this kind of information out yourself.



As for the local council communicating the works to residents, I was told in correspondence with my local council that responsibility for giving residents prior warning is the duty of the company carrying out the works: the 'statutory undertaker', rather than the authority. This is set out in Code of Practice relating to street works, and the issue of pre-warning residents would be discussed in progress meetings that are carried out with the street authority during the project. So it's Virgin Media's responsibility, basically.

By all accounts, Virgin Media was also present at the local Christmas lights switch-on, which again is useful if you're there, but hardly a foolproof way of communicating with people about your plans. Virgin Media claims in its documentation that its partners working on installing the actual cables will carry out a letter drop at least a week before the digging starts. Not in my case.

Granted, I'm not going to sit here and claim to be a deeply integrated member of the community, but as a parent, I do carry out the school run every morning and can say with some confidence that parents at the gates had little idea of what was going on beforehand either. One mother I spoke with said that a letter had been put through her door, but only on the day that the works began right outside her home.

As for the digging...

We Dig, Dig, Dig, Dig...

One of Virgin Media's major selling points of its cable installation is that it uses a method of digging called 'narrow trenching'. This method reduces the width of the trench used to lay optical fibre cables from around 40cm to 10cm and speeds up the installation process considerably. According to the firm, engineers can cover up to 100m in a single day.

Narrow trenching plays a significant part in Virgin Media's fibre proposal, promising a more efficient way of laying down cables and allowing the firm to connect cables direct to the home, future-proofing communities for when our digital needs demand even faster connectivity. It also means that Project Lightning can be rolled out at a faster pace without much need for complex machinery. Faster project rollout means less time on site and lower labour and machinery costs, and the impact of narrow trenching from the company's point of view shouldn't be underestimated.

But here's the thing. Despite all talk of the method being efficient, quick and cost-effective, it's still mightily disruptive. Road signs near me initially promised that the works would take a little over a month, which wouldn't have been too bad considering the size of the community.

And so it proved to be too good to be true. In fact, the dates on the sign came and went, and then a marker pen later

altered the dates to account for another month or so of works that were required to finish the job. As I type, the diggers are still in situ within the village as the works continue. Virgin Media responded to my questions on the length of time the works are taking by saying that with these types of roads, work can sometimes take longer than expected. I understand deadlines can be shifted and things can go wrong with any building project that might lead to delays, but we're talking months of works.

I'm not quite sure what I expected, but I cannot remember a single time since the start of the year that I didn't see diggers narrow trenching, temporary barriers blocking access to paths, and trucks. Lots and lots of trucks. While Virgin Media's contractors have obviously tried to stagger the works, and for that I have to give them some credit, the result has been that as it's taking so long to complete the full cable rollout, the village feels as though it's been under construction since 2016 began.

A Messy Job

Installing cables is a messy business, I get that. I don't think that excuses contractors for leaving a village looking as though it's just experienced the Dust Bowl of the 1930s. When the contractors had been and gone in my own street, it was an eyesore. Virgin Media told me that "it isn't always possible with the type of work being completed to make zero dust or dirt", which I took as being rather patronising, but then maybe that's just me.

Given that I didn't ask Virgin Media to come to my street in the first place, and given that I had no prior warning that it would be blocking our driveways, digging our streets and generally causing a lot of disruption, I think it's reasonable to

ask it to at least clean up after itself. I also take issue with the company's excuse that it doesn't normally use equipment to wash the street, as natural weather conditions will handle that. I can tell you that the rain has poured down many times since the works were completed (this is the UK, after all), and the dust and discoloured streets are still the same.

Aside from the dirt and debris, the narrow trenching technique may be a game-changer in terms of speed and cost, but it has one major drawback: it's ugly. After the trench is dug and the cable laid, fresh tarmac is poured into the trench to cover it up again. As you can see from the photo, the result is a long, uneven line right down the centre of the street. Now imagine those trenches running through every single street in your village, and the surrounding villages. Imagine those trenches running right across your own driveway and the one next to you and every single driveway in your community. Imagine trenches running right through grass verges, which saves on tarmacking but makes an absolute pig's ear of the verges themselves.

I don't have to imagine. My previously beautiful village has been ruined by these works, and if this is the price of progress, I do question whether it's worth it. I didn't ask for Virgin Media to come and dig up my village. I didn't ask it to render every single road an uneven, tarmacked mess. And yet it came anyway.

I did contact the local council to ask about narrow trenching and the subsequent clean-up operation, and according to Code of Practice, it isn't obliged to carry out a complete resurfacing of the footpaths, although I was told that this would have been the case out under the older, traditional construction methods. The council's hands are also tied on this, as the narrow trenching construction method has been approved by central government following its initial trial in Cambridgeshire.

As for cleaning up after itself, this is again Virgin Media's responsibility.

Why Me?

Why was my village selected anyway? According to Virgin Media, that's down to people registering their interest at virginmedia.com/cablemystreet. Is that it? No canvassing of local opinion through any other communication? No method at that same site of telling Virgin to stay away? It seems to me that the people who really, really want Virgin to come to their communities will contact the site and register their interest, but what about those of us who don't really want it here? What can we do? Once the decision is made, it seems there's very little you can do about it.

According to the council, Virgin Media is considered a 'statutory undertaker', which basically means that it has a legal right to carry out works on roads, so it doesn't need prior approval. Because Virgin Media considers Project Lighting to be a perfectly sensible project in commercial terms and for improving growth in the local area, it's free to go ahead. The street authority will then liaise with Virgin Media to make sure that works are carried out according to relevant legislation.

So here's a warning for when Virgin Media does come to your village, as you may not get one from the company. It could take longer than you're initially told. It could be very messy. It could be very disruptive. It could leave your village looking an eyesore. It could be the makings of a loud, stressful few months.

But hey, at least you'll have access to the fastest broadband around, right? [mm](#)



Is Wikipedia In Trouble?

Sarah Dobbs checks in with everyone's favourite user-edited wiki to find out why it's losing editors – and traffic

When was the last time you visited a Wikipedia page? Probably today, right? If not, it was almost certainly within the last week. Wikipedia is currently the tenth most visited website in the world, boasting around 500 million monthly visitors. From humble, idealistic beginnings back in 2001, it's grown to be part of the internet's furniture; it's so useful, you almost don't even think about it any more.

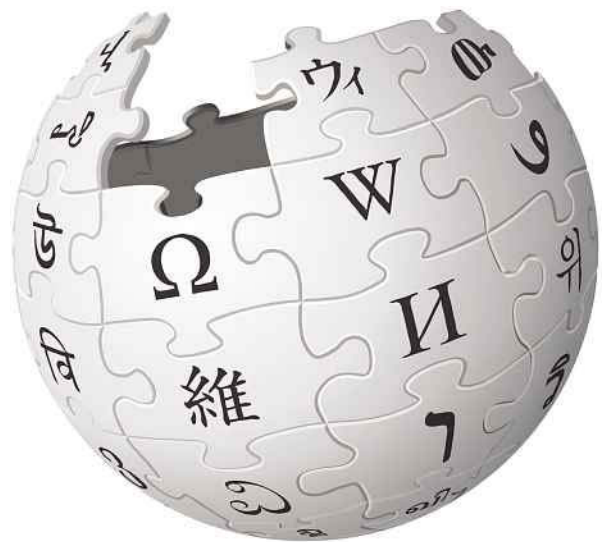
Imagine what it'd be like to live in a world without Wikipedia for a moment. Suddenly you'd have to trawl through a lot more pages to find the information you were looking for. Yes, you could employ the usual argument about how 'Wikipedia can't always be relied on, because information can be edited at any time by anyone', but it's impossible to deny how useful it is as a jumping off point for almost any research you have to do, and if what you're looking for is fairly uncontroversial, Wikipedia generally has the right answer.

Despite its popularity, though, it's starting to seem like we don't value Wikipedia enough. This in turn might be causing trouble for the site. Over the past year, there have been a few worrying headlines, suggesting that the Wikimedia Foundation, the overarching non-profit behind Wikipedia, is in financial trouble, that its board might be unsuitable, and even that its army of die-hard editors might be starting to go elsewhere. So should we start taking that idea of a world without Wikipedia more seriously? Let's have a look at some of the issues facing the internet's favourite resource...

Money Money Money

You've probably seen the banners: over the past few years, the Wikimedia Foundation has gone on a few fundraising drives, displaying prominent banners on the top of pages explaining that if only every visitor coughed up a couple of quid, it could pay all its server bills and keep the lights on at HQb (or something like that). You might even have donated.

After all, why wouldn't you? Wikipedia is free to access, with more accumulated knowledge on pretty much anything



you could ever think to look up than any other encyclopaedia you could name – and it doesn't even serve up adverts. The desperate sounding pleas, which end with "Please help!", make it sound worryingly like Wikipedia's in danger of shutting up shop in the near future. The least any of us could do is hand over the price of a pint.

It turns out, though, that even if you didn't donate anything, you don't need to worry on that front just yet. Although Wikipedia presumably has a massive server bill, it doesn't have many employees – about 150 – and so its overheads aren't as huge as you may imagine.

What's more, these donation drives do pretty well in general. On one day in the 2014 drive, Wikimedia received enough money to keep its servers running for 66 weeks – so despite the claims that less than 1% of its visitors donate, it still banked more than enough to keep the site online for a year in one

New features Log in / create account

Article Discussion Read Edit View history Search

Please read:
A personal appeal from
Wikipedia founder Jimmy Wales



Fundraising

From Wikipedia, the free encyclopedia

"Contributions" redirects here. For information about the Wikipedia user contributions log, see Help:User contributions.

Fundraising or **fund raising** (also **development**) is the process of soliciting and gathering contributions as money or other resources, by requesting donations from individuals, businesses, charitable foundations, or governmental agencies (see also *crowd funding*). Although fundraising typically refers to efforts to gather money for non-profit organizations, it is sometimes used to refer to the identification and solicitation of investors or other sources of capital for for-profit enterprises.

▲ *Wikipedia's appeals for donations have raised more money than the site currently needs*

single day. According to Wikimedia's own fundraising reports, too, the amount of money donated has climbed steadily, year on year; in 2012 it received \$38 million, in 2013 \$45 million, in 2014 \$52 million, and in 2015, a whopping \$75 million. And according to a Quora post by Jimmy Wales himself, it costs about \$5 million a month to run Wikipedia, which means the site's comfortably in the black for a while yet.

Right now, estimates say it's sitting on reserves of around \$60 million, about a year's worth of running costs. That's a fairly sensible amount – most businesses try to keep at least six months' worth of cash in reserve, ideally more, in case of reduced income in the future – but it does mean that cash flow doesn't look likely to be an issue in the near future.

Reduced Traffic

Something that might be an issue, though, is that Wikipedia's traffic is dropping. Last summer, there was a sudden spate of headlines shouting about how Wikipedia's traffic had dropped. An analysis by traffic measurers Similar Web showed that between April and June 2015, Wikipedia had lost more than 250 million visits, which sounds like a pretty significant dent in traffic.

Jimmy Wales was quick to respond to the analysis, calling it silly and pointing out that actually, that drop was part of a larger, slower decline. Wikipedia hadn't suddenly lost a ton of visitors – it had been slowly shedding them over a much longer period. Similar Web dug deeper, looking at Wikipedia's stats from February to July 2015, and found that Wales was right. Over that time, Wikipedia lost 550 million desktop visitors, and 500 million mobile visitors.

All of that means that Wikipedia's monthly visitor number hovered around the same number as it had been in 2011. Bit disappointing, since back then the Wikimedia Foundation had announced an ambitious set of goals that included bumping up its traffic to over a billion users per month by 2015; actually, it achieved less than half that.

Wales responded again by publishing all kinds of stats, and arguing with the claims that the drop was down to a reshuffle

of Google's algorithms. He reckons that the share of traffic coming from Google had actually increased, even if the actual number of visitors coming from the search engine had reduced overall. While he couldn't deny that Wikipedia's traffic has seen some significant shrinkage over time, he claimed not to be overly worried about that.

Indeed, in his disavowal of the criticism, he said "It is false that 'Wikipedia thrives on clicks', at least as compared to ad-revenue driven sites. The relationship between 'clicks' and the things we care about: community health and encyclopaedia quality is not nothing, but it's not as direct as some think."

“ Between April and June 2015, Wikipedia had lost more than 250 million visits ”

That's us told, then. Wikipedia is still top of the heap as online encyclopaedias go, and as long as the community's healthy and happy, everything's fine. Right?

No Confidence

Onto the next problem facing Wikipedia: despite the Wikimedia Foundation's stated commitments to independence, transparency, and community, there have been a few major disagreements recently between the board of directors and the editing community.

The first came back at the beginning of the year. On January, 1st Arnon Geshuri was appointed to the Wikimedia Foundation's Board of Trustees. As a former senior director at Google, and vice president at Tesla, he seemed like an ideally qualified candidate to help guide the Foundation's affairs. There was an immediate outcry among Wikipedia editors, however.

Geshuri, who'd worked in HR and recruitment in his previous roles, had been involved in a major scandal over an alleged 'no poaching' deal between Apple and Google. A federal investigation had been launched, leading to various technology companies including Apple, Google, Intel, and Adobe having to pay out \$415 million in settlements. Perhaps unsurprisingly, then, Wikipedia editors had their doubts about whether he really was such a suitable appointment.

One editor decided to take action. Ashley Van Haeften, who edits Wikipedia under the username Fae, initiated a vote of no confidence, asking the board to remove Geshuri. Ultimately 290 other editors voted in support of the motion, and by the end of January, Geshuri had stepped down. In a statement, Wikimedia Foundation's chair Patricio Lorente and vice chair Alice Wiegand said "Throughout the discussion about the appointment of Arnnon Geshuri to the Board of Trustees, the Board has carefully listened to you and discussed internally. Earlier today, Arnnon decided to step down from the Board. To paraphrase his words, he doesn't want to be a distraction for the important discussions that the community and the Foundation need to face in the times to come. We want to thank Arnnon for his ongoing commitment and for helping us to move forward.

"The Board Governance Committee is working to improve and update our selection processes before we fill the vacancy left by Arnnon's departure. We are sorry for the distress and confusion this has caused to some in our community, and also to Arnnon."

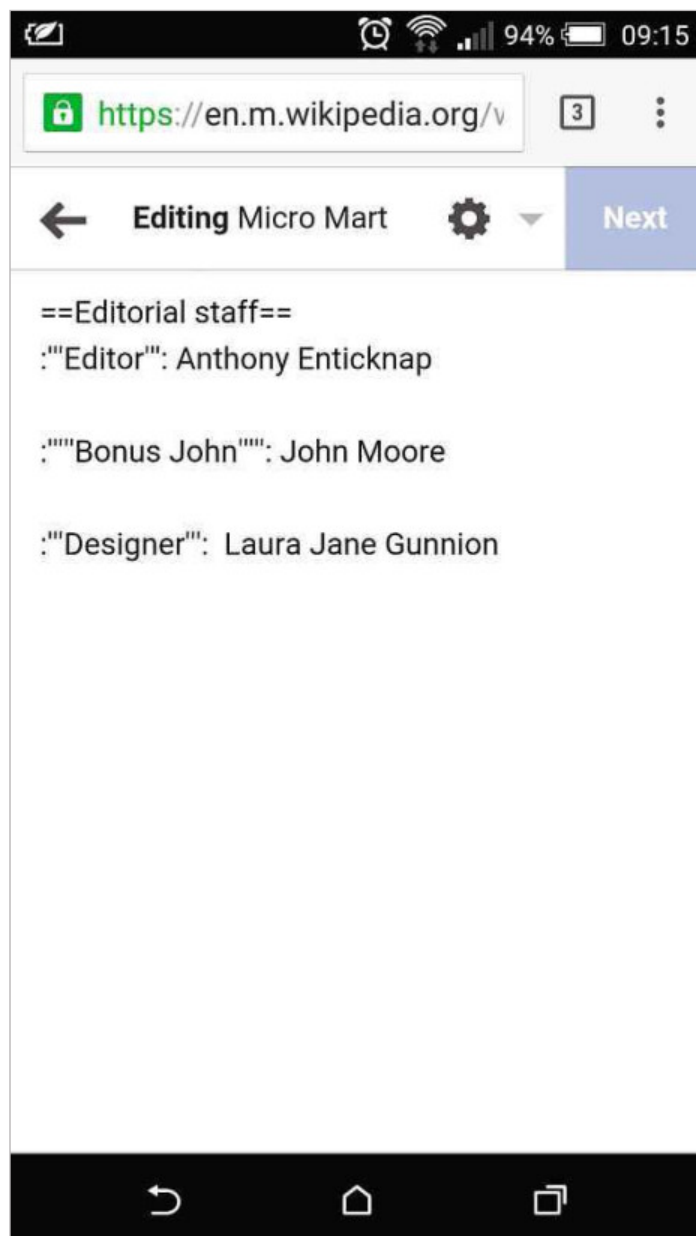
“ If the die-hards stop editing, the site will start to become outdated, and its rate of growth will slow down ”

Serious stuff, then. But that wasn't the end of it. At the end of February, Wikimedia's executive director, Lila Tretikov, also resigned. Though her announcement listed various accomplishments the Foundation had made while she was there, and didn't give much in the way of reasons for her departure. It seems that the problem is an ideological clash, though. Basically, the hundreds of people who give up their time and effort for free to edit the site and the handful of tech execs who make up the board don't have quite the same perspective on what Wikipedia is, and should be.

All Hands On Deck

That might be the biggest problem Wikipedia faces in the future. It's a project that really relies upon the goodwill and enthusiasm of unpaid editors, who'll dedicate hours to writing, referencing, and structuring articles – and then spend more hours arguing with one another about changes to those articles. If those people feel like the project they've devoted so much time to doesn't appreciate them, or if they feel like they're contributing to something other than the thing they've poured so much belief into, well, they're just going to stop doing it.

Indeed the number of active editors working on Wikipedia is in decline somewhat, in fact it's been on the slide since 2005 and is showing no signs of stopping. The site has still grown, of course, and articles continue to be created and updated, but it seems like the pool of editors is shrinking.



▲ Editing from a mobile device is tricky, with lots of obscure code to learn

That's actually two problems, rather than one. Firstly, if the die-hards stop editing, then the site will start to become outdated, and its rate of growth will slow down. That could lead to greater unreliability of articles, and gaps in Wikipedia's usefulness. Secondly, though, if Wikipedia ends up being written and edited by a comparatively small number of people, its ethos of objectivity could be at risk.

Studies done over the years have shown that Wikipedia already has an inherent diversity problem. For example, in 2013 a Wikimedia blog post said that approximately 90% of all Wikipedia editors are male. That's an overwhelming majority – and a disappointing one. If this resource is meant to reflect as much human knowledge as possible, having it written almost exclusively by one gender means it's got bias built in, and all the citation links in the world won't fix that.

Some universities have begun hosting Wikipedia editing drives, like the University of Oregon's Art+Feminism Wikipedia Edit-A-Thon, but there's a long, long way to go before anything

like equality can be reached across the site. For Wikipedia to truly live up to its lofty goals, the simple fact is that it needs more editors; more power editors, yes, but also more casual editors – just more editors, all round.

Unfortunately, it's fighting an uphill battle. Due to changes in the way we access the internet (mostly via mobile devices than desktops) fewer and fewer people will be willing to get stuck in and make changes to the site. It's not completely a matter of sheer laziness, either. Wikipedia editing involves writing long paragraphs, switching between tabs, and copy-pasting citation links, none of which is easy when you're using a palm-sized touchscreen.

What Now?

Starting to feel a bit panicky about how you're going to look up obscure trivia in future? The good news is, the Wikimedia Foundation is pretty well aware of all the issues it's facing, and there are some developments on the way that might help save Wikipedia from becoming a ghost site.

For starters, a new Wikipedia iOS app has just been launched, adding a few features to make the app more appealing and useful. It's got 3D Touch support, for one thing, but also a rejigged Explore feed that offers up content based on users' previous searches and their geographical location. That might help bump up the number of mobile visitors, and encourage them to delve a little deeper into the catalogue of articles Wikipedia has to offer.

Next, Wikipedia is tackling its problem with declining editor numbers by deploying artificial intelligence. Researchers for the Wikimedia Foundation have built AI engines that can crawl updates to Wikipedia pages and flag vandalism, making it much easier to keep articles reliable.

The team behind the AI also reckons it can use automated systems to encourage newbie editors to keep coming back. Wikipedia currently requires writers and editors to conform to various stylistic rules, or their contributions may be flagged or removed, even if they were done in good faith and just contained mistakes or misunderstandings. With the new AI, that might not happen; the bots should be able to distinguish someone typing in a load of nonsense to vandalise a page from someone who's trying to improve a page and just didn't format their links properly. Without the existing aggressive flagging system to put them off, new editors might stick around and try again. It's still early days for this process, but it's an interesting way of thinking about the problem, and might well work out in the long run.

Crunch Time

The thing that might really make or break Wikipedia's future, though, is a project the Wikimedia Foundation has been trying (and failing) to keep under wraps for a while now. Last September, the Foundation bagged a grant to start working on the Wikimedia Knowledge Engine, a search engine that could go up against Google. Since the number of referrals from Google has dropped, it makes sense that the Foundation might want its own version. Even at this early stage in its development, though, the Knowledge Engine has caused problems. Wikipedia community members feel that, by trying to keep their new project a secret, the Wikimedia Foundation is betraying its own ethos, and that it's taking things in a direction that most editors don't want to go in. That tension might even be what led Tretikov to resign. It feels hyperbolic to say it, but the Knowledge Engine really might change Wikipedia forever, depending on whether it gets developed, how well it's received – and whether the Wikipedia community is willing to accept it.

Who Makes Up The Wikimedia Foundation?

The Wikimedia Foundation is the organisation responsible for Wikipedia. But who are they? Let's take a look:



Patricio Lorente

Chair of the Wikimedia Board of Trustees, he was one of the founders of Wikimedia Argentina, and has been involved with Wikipedia as an editor since 2005.

Alice Wiegand

Former vice president of Wikipedia Deutschland, Wiegand has been editing Wikipedia since 2004, and currently serves as vice chair on the board.

Kelly Battles

Battles has a background in technology and engineering, and as well as her position on the Wikimedia board, she also serves as president of the Bodnar Foundation.

Frieda Brioschi

One of the founders of Wikimedia Italia, she's a computer scientist who works with startups and teaches at the Istituto Europea di Design.

Dariusz Jemielniak

A professor at Kozminski University, he's published extensively on Wikipedia and online sharing, and he's also the founder of Ling.pl, an online Polish dictionary.

Guy Kawasaki

His name might sound familiar – Kawasaki has worked for Apple, Google, and Motorola, as well as starting his own venture capital firm to invest in tech startups.

María Sefidari

Another professor, she teaches at Rey Juan Carlos University, has contributed to Wikipedia since 2006, and was one of the founders of Wikimedia España.

Denny Vrandečić

The first admin of Wikipedia Croatia, he's a computer scientist who works for Google, and has written extensively about the semantic web.

Jimmy Wales

You'll already know who he is – he's the guy whose face is on all the donation drive banners, and he's Wikipedia's founder.

For now, you probably don't need to rush out to the shops and panic buy a 12-volume edition of the Encyclopædia Britannica (if you can find one, that is). However, the Wikimedia Foundation probably does need to have a rethink of its stated vision and goals, and decide how, exactly, they should really apply to the thousands of people who've built its flagship website for them. [mm](#)

Alphabet Pi:

David Briddock meanders through Raspberry Pi technology from A to Z

D

THIS WEEK: Distros, Debian, Desktop and Development

Distros

Being a general purpose computer, the Raspberry Pi supports a number of operating system distribution images (aka distros). Apart from the official Raspbian, there are a number of other Linux-based alternatives such as Ubuntu Mate and the lightweight Snappy Ubuntu Core.

There are some specialist distros too. RISC OS is a modern version of the BBC Micro operating system, complete with BBC BASIC. The Open Embedded Linux Entertainment Center (OpenELEC) and the Open Source Media Centre (OSMC) are small, heavily modified Linux-based distros that turn the Pi into a media centre. And PINET is a centralised user accounts and file storage system designed for classroom environments.

“ The default Raspbian desktop environment is called LXDE ”

In 2015, Microsoft decided to enter the distro fray with its Windows 10 IoT Core. This slimmed-down version of the Windows 10 operating system is intended to encourage Internet-of-Things (IoT) initiatives and software development.

Debian

Debian was one of the first distributions to emerge from the Linux open-source community, with the first stable release appearing way back in 1996. Development heavily relied on software from the GNU project (gnu.org) and in the early days it attracted funding from the Free Software Foundation (fsf.org).

The Debian image (debian.org/releases) has a reputation for solid reliability, with lengthy spells between releases to ensure adequate time for testing. This is an attractive feature and has meant Debian is also used as the basis for other more specialised distribution images. One of these is the Raspbian operating system (raspbrian.org).

Major releases of Debian Linux are named after characters from the *Toy Story* films. A previous Raspbian distro was based on Debian Wheezy, named after the *Toy Story* 2 penguin who'd lost his squeaker. The latest stable release of Debian, version 8, is named Jessie (debian.org/releases/stable) and is the basis for the Raspbian Jessie distro.

Desktop

The default Raspbian desktop environment is called LXDE, which stands for Lightweight X11 Desktop Environment. Being lightweight means it doesn't stress the CPU or graphics processor – an important factor with computers like the Raspberry Pi.

LXDE is written in the C programming language and uses the GTK+ Toolkit (gtk.org), also known as the GIMP Toolkit. The GIMP Toolkit is a very popular cross-platform open-source project specifically created to help developers create rich graphical user interfaces (GUIs).

Development

The Raspberry Pi Foundation is always looking for system solutions that encourage coding. From the very beginning, the Raspbian operating system included Python, a popular and easy-to-learn programming language. Various Python libraries were also included, including one that simplifies access to the GPIO pins.

Scratch is another popular Pi language. Here coding is done by snapping-together coloured blocks rather than lines of hand-written code. It's especially good for graphical and animation projects, which means it's a firm favourite in many classrooms. Scratch also has full support for the GPIO pins.

Recent Rasbian distro images included Java, a powerful language used by many professional software developers. Raspbian Jessie also includes two apps called BlueJ and Greenfoot, both aimed at simplifying the Java app building experience. They have a highly graphical coding environment, which blends mouse-driven design and code generation with traditional hand-coded statements. [mm](#)



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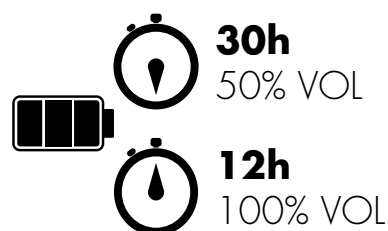
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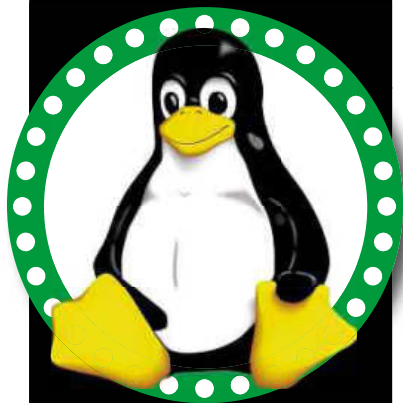
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David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

Distro Junkies Unite

Do you distro hop?

I was having an interesting conversation the other day with some few fellow Linux users, and I was quite surprised by how many of them – six in total – don't bother distro hopping any more.

In fact, there was only one of us who still hops from one distro to another, and that was me. I hop from one distro to the next mainly due to the work I do for Micro Mart, I usually end up settling for the latest Ubuntu or Mint, though, mainly because they're easy to use and quick to get up to a certain running standard.

The others I asked had all settled for a particular distro, be that Ubuntu, Mint or something else, and I was also quite shocked to discover that they don't bother upgrading to the latest versions either.

Out of the seven of us talking about it, two were still on Mint 14, another was on Ubuntu 12.04 and the rest were on various other older versions of their favourite distro, with the exception of one who preferred Arch and its cutting-edge rolling release cycle.

What About You?

This got me thinking: I the only one who still hops from one distro to the next?

As I said, I normally change due to work, but I do occasionally hop around based on what I think looks interesting, what has something that's a little

different from the norm, or what offers something specific – like hacking tools, anonymity tools and so on.

With this in mind, I thought it would be interesting to ask which of you still distro hop. If you do, what is it that makes you decide which distro to go to? On top of that, how about recommending a few unique distros you've come across while hopping and what it is that makes them stand out from the crowd.

I'm not going to collate the information or anything; it's more of a social thing really, to see what's out there and who uses which distro(s).

Anyway, if you're up for letting everyone know what distros you tend to opt for and what makes you interested in one or another, then please write in to the letters@micromart and tell us what you think.

If don't distro hop any more, let us know why, as well as which distro you prefer to stick with and why.

Niche Distro

Before I sign off for another week, a quick news item has just appeared relating to the rumour that Nvidia is working on its own unique distro.

It's a possibility, I suppose, but I'm not quite sure of its authenticity. After all, Nvidia has the Shield, which it has pumped a lot of money into, and its own version of Linux won't really benefit anyone beyond SteamOS anyway.

Like most rumours, though, only time will tell whether there's any truth to it or not.

▼ Which distro are you?



The affordable home creative computer...

Sven Harvey is perturbed

When all those A500s were originally sold in 1989 and onwards, they came with Deluxe Paint as standard. Much to the surprise of many, it was the DPaint disks in those packs that got used the most and longest out of anything put in the box software-wise. This tended to continue with the productivity and creativity software that came with the A600 and A1200 bundles (again usually Deluxe Paint). Often it was very much the case that come Christmas day, when the bundle had been cracked open, by tea time (or *Doctor Who* special time as it's now known), the games were completely to one side as the little 'uns (or not so little 'uns) were creating their first digital masterpiece, much like Andy Warhol did at the Amiga's launch.

Then along came the magazine coverdisks... Protracker, and the PT-01 disk (the samples of which were still being used by pro musicians up to last year at least), Comic Setter, OctaMED, Personal Paint, Scala, ImageFX, Aladdin, Imagine 3D, even Cinema 4D – joined by the likes of Pagesetter, Pagestream, WordWorth and so on. At around £400 for the machine, when PCs were £1,500 to £2,000, and brilliant creative software made available for the price of a magazine, it was no real surprise that the home Amigas were known as the way young adults expressed their creativity digitally, especially when it came to internally produced graphics, animation and sound (bearing in mind a £1,500 PC in 1989 was monochrome and beeped).

Where are we now? A decent specced AmigaOS 4 native computer is going to set you back between £600 to £1,000 with the really good stuff being over £2,000. Software is hard to get hold of in comparison with the old days, as there simply isn't much being produced, because the user base is too small, because the prices are too high, because the userbase is too small, because there's very little software. A perfectly formed vicious circle of attrition burying the venerable format under initial manufacturing costs and the dogged attachment to hardware, in the form of a CPU family, that for general computing, truly is a dead end.

This is not the Amiga that Commodore UK did so well to almost single handedly build up. Elitist, low-value, high-cost PowerPC chained, underpowered, with little and expensive software is hardly the successor to the A1200!

The PowerPC roadmap is pretty much dedicated to embedded computing with processors as part of a range of systems on chips, which although great for embedded applications, don't offer a god price/performance ratio for general or home computing.

With AmigaOS 4.x breaking its shackles from the 32-bit

processors and becoming 64-bit and supporting multi-threading, you ask yourself if it's worth it for the development of PowerPC.

Meanwhile, a small British not-for-profit team have produced a series of computers with continually improving specs, the latest of which has 1GB on-board memory, a quad-core 1.2GHz 64-bit processor and a 1080p HDMI output at a base uncased price of £30. That makes the top-of-the-range AmigaOne look positively archaic, with its dual-core 1.8GHz 64-bit PPC CPU and £2,105 price.

Is PowerPC now the gloriously seabird flavour Albatross around the Amiga's neck? Almost certainly.

An Amiga-like machine based on the Raspberry Pi 3 with an FPGA emulation of the early Amiga chipsets could theoretically be not much more than £100.

PowerPC is holding the platform back from being where it needs to be to even start to carve out a hobbyist niche, let alone anything else. Moving Amiga OS4 to ARM 64-bit chips has to be a better way forward, surely, even with the time scales as they would be?

Amiga should stand for affordable creative computing for all... not "how much?!?"

ARM 64 can offer that when PPC 64 cannot.



Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

Amiga





Ian McGurran is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Comparing Apples With Apples

Ian McGurran looks at Apple's new ideas in old cases

The secrecy around Apple's forthcoming products has been somewhat leaky for the past few years. Whether that's a move on purpose by Apple or just the hyperconnected world in which we live these days, who knows, but one thing's for sure: what was announced at Apple's 21st March event didn't come as a surprise.

iPhone SE

Apple launched a new iPhone! At its spring event, not its autumn one! Okay, so while this is true, and unprecedented, given iPhones launch in the latter part of the year, this is not the iPhone 7. Nor is it a compact, 4" screened iPhone 6 either, sadly, as that would have been tempting. What we got instead is exactly what had been rumoured, a more powerful iPhone 5S called the iPhone SE. To be fair, that does it some injustice, as the innards are much more powerful than the 5S, and even the 6, with the SE sharing some of the 6S's chips and imaging sensors. It's also fully conversant with Apple Pay, making it the cheapest way into the system, given an Apple Watch still needs you to have an iPhone already. But for all the power, the design is pretty much the same as the 5S, and you can even use 5/5S cases with it. The screen retains the same Retina display too. The 5S was a great phone, even currently, given the lack of flagship compact devices in general, but this looks like a missed opportunity to have made more of an

effort with the design, especially at £359 and up.

iPad Pro 9.7

If the iPhone SE has you confused, the iPad Pro 9.7" will baffle you. The iPhone SE is at least Apple's only 4" device, but the Pro 9.7" is the company's second 9.7" device currently available. To look at, the original iPad Pro was a steroid-pumped iPad Air 2, so therefore a smaller iPad Pro should look like... you guessed it, and it does. In fact, like the iPhone SE, the iPad Pro 9.7" is the spit of the device it coexists with. Now, Apple may be many things, but it isn't quite so arrogant as to release the same device with a new name, so you won't be surprised to hear the Pro 9.7" is somewhat more powerful and better appointed than the Air 2. Another non-surprise is that the 9.7" version is exactly the same as its bigger brother, with the exception of the screen resolution. This means a more powerful A9X CPU, a clever four speaker setup and

even compatibility with Pro accessories, like the pencil and keyboard (though the 9.7" does have a smaller version). The 9.7" even beats the iPad Pro 12.9" in a couple of areas: rear camera (12MP over 8MP) and front camera (5MP trumping 1.2MP), as well as 4K video recording.

These two new Apple products demonstrate their commitment to the refinement of their product line. The iPad Pro 9.7" seems a logical use of the iPad Pro 12.9" technology. It's certainly powerful, although quite where it leaves the iPad Air isn't clear. The Air can't leapfrog the Pro in terms of power, and given the A9X would have been the logical next CPU for the Air, what we may be seeing is the end of the 9.7" non-Pro device, with only the iPad Mini remaining as a 'consumer' device. This may well reflect Apple's rumoured changes to its Macbook range, phasing out the Air and having only the Pro and the Retina 12" Macbook.

The iPhone SE is also something of a gamble. It's certainly a great compact smartphone, although we're now in a world where great compact smartphones start at under £100, not £359. The design seems a real missed opportunity too, though it is Apple's budget device; it's not there to be pretty and eat away at the 6 and 6S's sales. Things may become clearer as the new Macs and iPhone come to market, but at the moment, it's not clear which way the good ship Cupertino is sailing.



BBC Micro Hit?

The BBC Micro Bit is intended to secure the future of computing, but it has the elderly Andrew Unsworth reminiscing

This week's news, especially that of the BBC (goo.gl/9KZUTY), has been concerned with the donation of thousands upon thousands of BBC Micro Bit computers to this nation's nippers. Much like the ubiquitous and phenomenally successful Raspberry Pi, the BBC Micro Bit is intended to teach children the basics of computing and programming. The Micro Bit will be given out to schoolchildren and may not be available to the general public through retail channels, making it less common than other types of computer. This is why it reminds me of the original BBC Micro that was released in the early 80s.

The original BBC Micro was also designed to be an educational tool. Back then, it seemed to me that the only people who ever owned one were those whose parents took their education so seriously that they were rarely allowed to play on it. Indeed, I can only remember one person having one, although there must have been more. This is in stark contrast to the Sinclair ZX Spectrum, which everyone seemed to have and which was the source of never-ending fun and jollity.

That isn't to say that the BBC Micro wasn't fun. I can still remember finding a filthy 5.25" floppy disk (it even had a footprint on it) at the back of some school cupboard, putting it into the disk drive of the school's BBC Micro and swearing with delight at finding a treasure trove of games on it, the best being *Yie Ar Kung Fu* (tinyurl.com/jjbh88r). Within minutes, a group of us were beating keys like Bruce Lee and grinning from ear to ear.

That convoluted trip down memory lane has brought me back to the point I'm trying to make. I hope the BBC Micro Bit does breed a new generation of programmers, but I reckon it'll be the commercially available and much more accessible Raspberry Pi (this generation's ZX Spectrum) that'll really prove to be the catalyst. The Raspberry Pi is the kind of thing you're encouraged to use and something you feel comfortable experimenting with, because it's so cheap you don't have to worry about breaking it. That said, schoolchildren won't have to buy the BBC Micro Bit, so maybe it won't be considered too precious to use and children will be encouraged to use it.

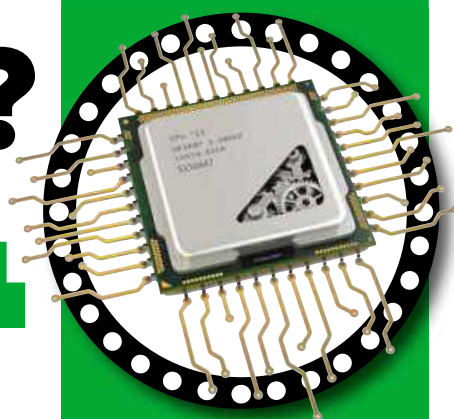
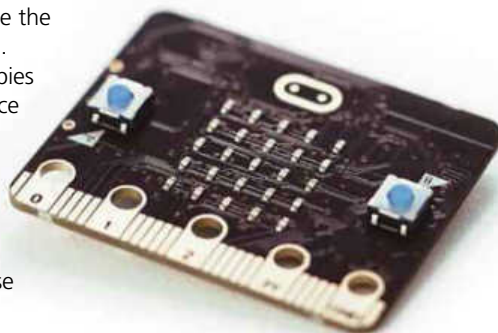
What struck me as most odd about the BBC Micro Bit coverage is not that the devices are going to be given away for free, but the suggestion that programming a computer is something that is still not mainstream, that it's still the preserve of the moody nerd. Yet programming is free to do, and the internet now provides all manner of instruction in it. I find it odd that something that seemed so natural to a generation of schoolkids in the 80s should have seemed so underground in the 90s, the noughties and now, it seems, in the middle of the 2010s.

I blame the rise of the windowed operating system and the demise of the BASIC interpreter, but maybe the problem is marketing. Perhaps coding occupies the same mental space as algebra, in that it's something that isn't inherently difficult but something that is made difficult because

people are told that it's hard and so avoid it like the plague because they've convinced themselves that it's impossible.

Despite the public's impression of it, programming is as much art as it is science. You can give two programmers the same problem to solve and they'll both come up with a different solution, each as valid as the other (assuming the software works and has passed testing). Contrary to popular belief, programming and software development is an immensely creative pursuit. No matter what your age, you can learn to program and enjoy the satisfaction of having made something, even if it's something simple that only you and possibly a few other people will use.

Programmers on TV always type at warp-speed, never plan their programs before they start slapping a keyboard and their code always compiles first time, but this isn't the case in real life, even if you're an experienced programmer. Your first few programs probably won't compile first time, never mind run, but that's okay; just accept that you'll make mistakes and persevere. All the programmers that went before you have done exactly that. With grit and determination, you'll improve. Whether you have a PC, Mac, Raspberry Pi or the BBC Micro Bit, get coding and have fun.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner and his handshaking skills are second to none

Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming

Cutting Edge

Ninja Theory's Hellblade takes into the mind of a traumatised warrior fighting her inner demons. The most intriguing action game of 2016? Quite possibly

This week, Ryan takes a look at Ninja Theory's action game *Hellblade*, and checks out *Star Wars: Battlefront*'s new DLC, *Outer Rim*...

Plug & Play

If there's one thing we love about advancing technology, it's that it gives us ever smoother and more convincing ways of hitting things that don't exist. Through games like *Heavenly Sword* and its *Devil May Cry* reboot, British developer Ninja Theory has built its reputation on crafting slick, exciting brawlers – a tradition it's continuing in *Hellblade: Senua's Sacrifice*.

Based on Celtic myth, *Hellblade* first emerged in 2014, but the game's gone through a fair amount of retooling since. In September last year, Ninja Theory announced via Twitter that a 'vertical slice' of the game shown off at Gamescom was being 'retired', with production continuing without some of the ideas presented within it. *Hellblade*'s core idea, however, still remains: it takes place within the heroine's troubled mind, with the demons plaguing her thoughts manifesting themselves as literal monsters that the player has to fight in order to survive. The collision of a hack-and-slash action game and mental health issues may sound like strange bedfellows, but Ninja Theory appears to be going to considerable effort

to present the topic with the respect it deserves – the studio's even enlisted the help of a psychiatrist and the mental health charity, Wellcome Trust.

Such an atypical subject matter would almost certainly put a mainstream publisher off, so Ninja Theory's taken the unusual step of producing *Hellblade* independently, with a relatively small core team of 15 working the brawler while the rest of the studio puts together the more mainstream *Disney Infinity*.

That low head-count doesn't mean a small-scale indie game,

though – the detail in *Hellblade*'s motion-captured characters looks extraordinary, while the use of procedural generation means that a vast, craggy landscape of rocks and skeletal trees can be created without hours of painstaking design by hand.

With *Hellblade* touching on such delicate themes, it isn't difficult to see how even a well-intentioned game could go wrong. At the same time, we can't help but admire Ninja Theory's bravery in making a game with such a thought-provoking premise.

Gollop's Got Game

If you're into strategy games, you'll know that Julian Gollop's been behind some of the best examples of the genre, including *X-Com* and, most recently, the superb *Chaos Reborn*. The industry veteran isn't stopping there, either. He's recently announced *Phoenix Point*, a new game featuring "turn-based tactical combat" and "world-based strategy." A teasing silhouette of a strange beast suggests it'll be another fantasy offering; further details are in short supply right now, but we're looking forward to finding out more very soon.

► *Strategy game veteran Julian Gollop's next game is called Phoenix Point. What is it? We've no idea right now, but our enduring love for his earlier games means we're excited already*





▲ *Star Wars: Battlefront* has a new slab of content out, but are Greedo and Nien Nunb enough to reignite interest in the shooter?

You can find out more about Hellblade - and see its new trailer - at www.hellblade.com.

Online

Star Wars: Battlefront may be a shooter first and foremost, but it's also the digital equivalent of a room full of action figures. There's a certain appeal to seeing Emperor Palpatine floating ominously around a warzone, frying Rebel soldiers, for example, or having Boba Fett locked in a screaming gun battle with Princess Leia.

Battlefront's new update, *Outer Rim*, introduces a couple more virtual action figures to gleefully bash together - green-skinned Mos Eisley denizen Greedo and wide-eyed Nien Nunb, the Millennium Falcon co-pilot from *Return Of The Jedi*. *Outer Rim* also adds a sprinkling

of new weapons and cards - the Dioxis Grenade looks particularly fun - plus three new maps set on Tatooine and Sullust.

While EA's gameplay trailer highlights the dramatic possibilities *Outer Rim* offers (not least a new face-off between Han and Greedo), the DLC probably won't do much to silence the complaints that *Battlefront* is rather lacking in long-term appeal. Sure, the distinctive pew-pew of blasters and the roar of X-wing engines is exhilarating stuff for a while but, thus far, EA hasn't been able to answer a key question: once you've taken in the sights and sounds of the *Star Wars* universe, why keep coming back week after week?

Outer Rim's additional content looks fine at first glance, but look again at those maps: they're

new locations on the same planets users have been battling across since *Battlefront's* launch last November. Even the choice of Nien Nunb and Greedo as new player characters seems a bit curious when the likes of Lando and Chewbacca are still conspicuously absent.

If you want evidence that player interest in *Battlefront* may be on the wane, take a look at the tracking website, **P-stats.com**. At the time of writing, it's Saturday morning - surely the perfect time to kick back and indulge in a long gaming session. Yet P-stats suggests that fewer than 5,000 PC users are logged onto *Battlefront*.

To put that into perspective, the same site revealed that 48,282 players were blasting through *Battlefront* shortly after launch last November. That's quite a drop, even when you allow for the game's four month vintage.

For the sake of balance, it's worth reiterating that *Star Wars: Battlefront* looks and sounds fantastic - as an interactive version of the Lucasverse, it's difficult to fault. Yet the game arguably needs a shot in the arm: more to see and do, and more reasons to keep playing than affection and nostalgia. When

you consider that a copy of the game costs around £35, with a season pass setting you back roughly the same again, it begins to look very expensive. Here's hoping the next content updates - this summer's *Bespin* and the autumn's *Death Star* DLC - give the game the depth it deserves.

Incoming

Sword & Sworcery and *Super Time Force* marked Cappybara Games out as a great indie developer. Now it's back with a quirky new game called *Below*, within which you take control of a tiny adventurer dwarfed by a vast landscape of craggy rocks and caves.

It's another game using procedural generation to create an unpredictable world to explore, but *Below* looks as though it takes a refreshingly different approach to such activities as crafting and survival. Unlike a lot of dungeon crawlers we've seen in the past, *Below* appears to be quietly atmospheric rather than action-packed; out are the armies of vicious monsters, and in are echoing caverns and ancient ruins that silently beckon the player in.

Below is currently scheduled for release this summer.



▲ Cappybara Games' forthcoming survival game *Below* looks like an atmospheric explore-'em-up. Look out for it this summer

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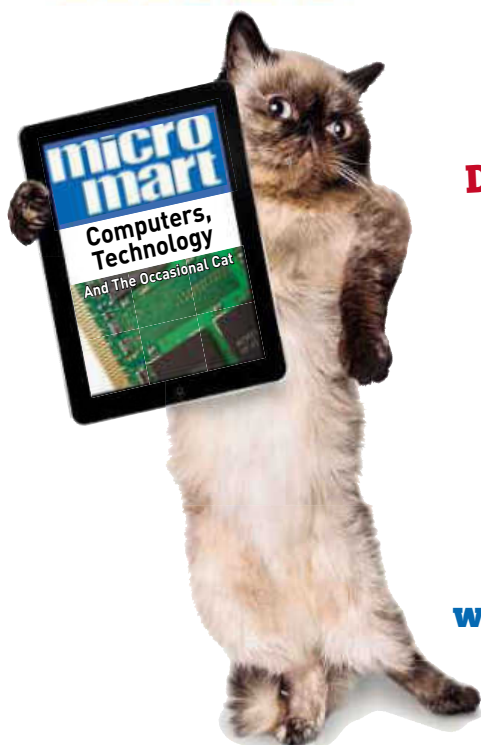
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Netgear; RangeMax DG834PN & WPN824 routers. No Cables or adaptors. £5 plus postage for the pair. (untested).
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D3H motherboard wanted.
Email: johnbeiry@gmail.com

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(beige colour if possible) to
rehome an Amiga A1200
vintage computer. The Amiga
motherboard is H 410mm x L
190mm (H 16" x L 7.5"). PSU not
an issue but if available 250 watt
more than enough.
Tel: Bill (07742) 061569 or
(02641) 769503.

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for a pensioner with few resources.
Tel: Wilf James (01767) 699809

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Email: ivor.mary@talktalk.net

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but have lost my original
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Email: david.maddams@icloud.com

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Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Offline After Update

Wanting to give my Dell Inspiron Mini 1012 a speed boost, I fitted a 250GB SSD and did a clean install of Windows 7 starter. Then, I began the mammoth task of downloading all the Windows Patch Tuesday bug fixes.

Things went brilliantly until it was time to install SP1, as a new version of Windows Update was required too. Once the required restart was completed I opened Windows Update to get the next load of bug fixes, but no matter how long I waited, nothing was happening with Windows Update. It would not download anything else. I could manually download things myself, but Windows Update seemed to be forever 'searching for updates'.

I have the program 'Network Activity Indicator' (that replicates the Windows XP System Tray icon showing internet traffic via two flashing blue computer screens) so I can see if anything is being sent or received via the Internet, and this confirmed Windows Update was idle. Not even Microsoft's WindowsUpdateDiagnostic or Windows Update troubleshooter Fix It repaired the problem.

Thinking SP1 was the bugbear I did another install, however this time from a Windows 7 SP1 Pro disc, but that would not download any updates at all.

Do you have any idea what is wrong with the post-SP1 Windows Update? There is 37GB free space on the HDD so that is not the problem. I have things I want to do in my life rather than go to Microsoft's Knowledgebase web page and download each bug fix individually?

Jonathan

This fairly common issue has spawned a couple of different fixes, which seem to work for most people, so hopefully we can resolve this for you with little fuss, Jonathan.

The first, and most straightforward method that's worked for some users is to perform a system restore to a setup prior to the upgrade. With a little bit of luck, this restore will roll

your system back to a pre-SP1 state that'll have a working Internet connection with which you can continue updating. You can then upgrade again, as most of the time the upgrade seems to work fine with no issues after SP1 installs.

After upgrading and seeing the issue for yourself, though, I'd understand if you consider this to be a pointless exercise, as there is a chance it could all just happen again in the same annoying cycle. So, instead, you could try an alternative solution.

“ This issue has spawned a couple of different fixes ”

The next fix involves turning off a feature of TCP Auto Tuning. This 'autotuninglevel' element has seemingly been directly responsible for the loss of Internet connection for many users, and disabling it can apparently remedy the situation. To do this, you will need to open up an admin command prompt. Then, at the prompt, type:

```
netsh int tcp set global autotuninglevel=disabled
```

Press Enter and the fix should take effect immediately, so test the Internet out and see if everything works. If not, you may need to disable another feature of the Auto Tune function. You can do this by going back to the command prompt and typing:

```
netsh int tcp set heuristics disabled
```

Once this is done, give it another go. You should be online again, and can download more updates.

▼ TCP Auto Tuning can cause issues when updating

```
C:\Windows\system32>netsh int tcp set global autotuninglevel=disabled
Ok.

C:\Windows\system32>netsh interface tcp show global
Querying active state...

TCP Global Parameters
-----
Receive-Side Scaling State           : enabled
Chimney Offload State                : automatic
NetDMA State                         : enabled
Direct Cache Access (DCA)           : disabled
Receive Window Auto-Tuning Level    : disabled
Add-On Congestion Control Provider  : none
ECN Capability                       : disabled
RFC 1323 Timestamps                 : disabled
```

Mismatched

I've upgraded my PC's RAM after purchasing a new stick to give it a boost. Previously it had only 2GB of RAM, so I bought a 4GB stick to give me more speed. I installed it with no problem, but when I came to boot up Windows I was met with an error. It said there was a page fault in a non-paged area, or something along those lines. I've also seen a message about system thread exceptions.

I've tried rebooting, and have also tried switching the sticks of RAM around, but the same thing happens. If I run with my old RAM, or just the new RAM on its own, the system seems to operate with no problem. It's very confusing, as the RAM obviously works, but together, they cause the errors.

I really don't want to go out and buy more RAM if I can help it, as I'm on a pretty tight budget, but if I need to, I could possibly stretch to another 4GB module as it's not that expensive, and my local computer shop (an indie outlet), is having a sale on RAM. I guess it would make sense to take advantage of it.

I'd appreciate any help, as it seems as though I've wasted money on the RAM, and I'm concerned my system is at fault.

Kyle

Although I don't have any of your system details, so can't really make any deductions based on actual hardware, I'd say there's a very good chance that your motherboard runs in what's called dual channel

mode. This requires both RAM modules to be matching pairs, installed in the corresponding colour-coded slots. If you attempt to use differing modules, you'll likely hit this kind of issue, or even be left with a PC that won't POST at all. This is only strengthened by the fact that your system works fine when using only one of the modules. This being the case, I'm afraid there's not much you can do other than use one of the two sticks, obviously the new 4GB module as it'll give you more RAM than your old 2GB one. At least you'll have twice the memory, so your money won't have been totally wasted.

To avoid this issue, always check your documentation to make sure you buy the correct type of RAM for your board. If you can't find this information, check the motherboard manufacturer's website or visit www.crucial.com. Here, the popular RAM manufacturer has a downloadable system scanner that can give you information on the type of RAM you can use. With this information, which you can use even if you don't intend to buy Crucial-branded memory, you can then buy new RAM confident in the knowledge it'll work.

When you get the new RAM, or a second 4GB stick that matches the one you've already bought, make sure you slot it into the correct channel if there's more than two. These will be coloured, and most would advise you use the second slot, not the first that's closest to the CPU. Once installed, your system should boot up without incident.

▼ **Before you buy new RAM, always check to see if what kind of RAM your system needs, and if it requires dual channel**

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While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

Board Game

My PC's motherboard has died. I assume the motherboard's the problem, anyway, as I've noticed some melted components. The PC shut down without warning a few days ago and now won't boot. The specs are below.

- **CPU:** Core 2 Quad Q6600 (2.4GHz, quad-core)
- **Motherboard:** Asus P5Q Deluxe
- **RAM:** 2 × 2GB DDR2-1066
- **Graphics:** 512MB Radeon HD 2600 Pro
- **HDD:** 320GB (SATA-2)
- **Optical:** DVD rewriter (IDE/ATA)
- **PSU:** 350W Antec
- **OS:** Windows 7 Home Premium (64-bit)

Buying a new PC is out of the question, but it seems all new LGA 775 motherboards use the low-end G41 chipset and need DDR3 RAM. There's ASRock's G41M-VS3 R2.0, for example, which I've seen for £57.99. I'd have to get 4GB of DDR3 on top. My other option is to buy second-hand off eBay – the P5Q Deluxe goes for about £85. Which way should I jump? I'm not a gamer and just want a reliable PC for the web and office-type work.

S Smith, Gmail

Don't hate me for saying this, but you'd be bonkers to spend £85 on a second-hand LGA 775 motherboard. Would it work properly? How long would it last? As you've found, though, new LGA 775 motherboards aren't especially enticing either – or cheap. The G41M-VS3 R2.0 is a good few rungs down the ladder from the P5Q Deluxe.

So, while buying a new PC may not be feasible, what about buying just new guts? As shown by the following list of parts and typical prices, gearing up with LGA 1151 and Skylake – as up-to-the-minute as it gets – might cost less than you think.

- **Pentium G4400 (3.3GHz, dual-core):** £50
- **Gigabyte GA-H110M-S2H:** £48
- **4GB Crucial DDR4-2133:** £13.50
- **Samsung SATA 24×/8× CD/DVD rewriter:** £12.50

Not bad for £124, eh? All your other bits could be reused. The reason for the replacement DVD drive is that modern motherboards don't generally have any IDE/ATA ports. If you can live without a DVD drive (most people can), so much the better. Also, for the RAM, I've listed 1 × 4GB, not 2 × 2GB. That's because 2GB sticks of DDR4 aren't generally available. To use the CPU's dual-channel function, you'd have to buy 2 × 4GB, but I doubt you'd notice any benefit.

Remember, of course, that you could always resell the leftovers from your current rig on eBay. Below is roughly what they're worth (plus postage).

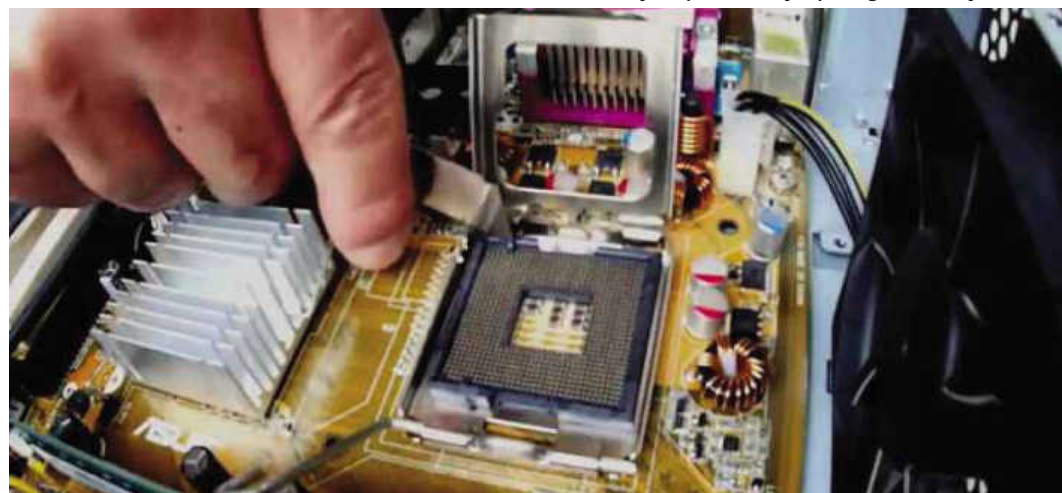
- **Core 2 Quad Q6600:** £17.50
- **2 × 2GB DDR2-1066:** £15
- **512MB Radeon HD 2600 Pro:** £15
- **DVD rewriter (IDE/ATA):** £7.50

After fees, you'd see around £40 in your pocket, bringing down your outlay to the level of a used P5Q Deluxe. There's simply no contest, is there? In terms of performance, the Pentium G4400 is around 33% faster than your old Q6600, despite having half the number of cores. Cast your eyes over AnandTech's benchmarks: goo.gl/2T2qf4.

Moreover, the Pentium features an integrated HD Graphics 510 GPU. This would be significantly quicker than your old Radeon, hence why I've suggested selling that on. A recent PassMark analysis (see goo.gl/as2UK4) reckons it's four times quicker, though I think that's somewhat optimistic.

One snag is that the motherboard swap – even if you stick to LGA 775 – may cause Windows to become deactivated. If that happens, a quick call to Microsoft's automated hotline should sort things out (dial the number shown on the screen). If you go the LGA 1151 route, Windows may also need to be reinstalled. The hassle of that is offset by the fact that you'll have hardware guaranteed to work on Windows 10, which is still a free upgrade until 29th July.

▼ Should you spend money repairing a Core 2 system?



Risk Assessment

Yesterday I bought a 2TB WD Elements Portable hard drive. I got it from the WD online store, and I thought I'd bagged a bargain, as it cost just £49.99. Everywhere else was selling it for around £70. Today, though, I've realised that it's a recertified model. What does this actually mean? I've tried to cancel the order, but the drive has already been dispatched. I'm planning to use it for backups.

Brian, Gmail

Recertified drives are ones that buyers have sent back. Some will barely have been used – maybe the buyers just changed their minds. Others will have been opened up and repaired (by the manufacturer) – maybe they developed bad sectors while under warranty.

In my experience, buying a recertified drive is a gamble. Will you receive one that's had only ten minutes' running time? Or will you receive one that's had a platter or read-write head replaced? You've no way of knowing, and I fancy it makes a big difference to a drive's likely longevity.

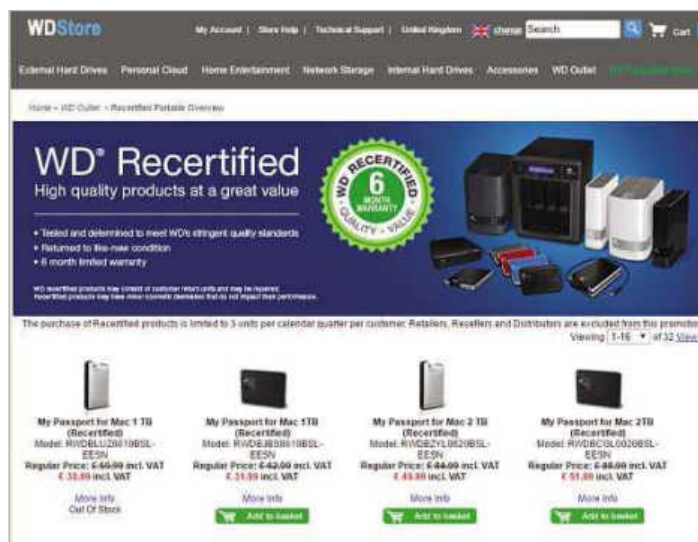
My experiences aren't good, I have to say. I've received several recertified drives over the years (not necessarily WD drives). Some I've bought and some have been sent as warranty replacements. Roughly half have either been dead on arrival or dead soon after. It's interesting that the UK warranty on new Elements Portable drives is two years. On recertified models, it's six months. Ask yourself this: why?

Of course, I may have been simply unlucky, but still, I now steer clear. Data is valuable, and exposing it to needless risk for the sake of a few quid just doesn't make sense. If I were you, Brian, I'd file an RMA as soon as your drive arrives. * Return it. Leave the packaging sealed, so

WD can easily resell the drive to someone else. Buy the same model again – it's a solid choice – but this time a brand-new one.

* The Consumer Contracts Regulations allow you 14 days after receipt to notify a seller of your intention to return an item (not applicable to business purchases). You don't need to give a reason. I believe WD extends this protection to 30 days (business purchases included).

▼ If the drives really are 'like new', why not provide a 'like new' warranty?



Monitoring The Situation

I'm thinking of changing my 1080p monitor to a 4K/UHD model (3840 x 2160). I remember reading in Micro Mart some while ago that many models were restricted to a 30Hz refresh rate, which is useless for gaming (which is what I'd buy the monitor for). Has the situation changed now? What pitfalls should I be aware of?

Shaun, Oxfordshire

Thankfully, most current 4K monitors support 60Hz.† Some older ones are still floating about, of course. Users only interested in desktop work can just about get away with 30Hz, though it can lead to juddery scrolling and a jerky cursor.

What you really need to pay attention to, Shaun, is inputs and outputs. Over HDMI, 4K is supported in version 1.4, but the limit there is 30Hz again. For 60Hz, version 2.0 is required. The only GPUs that currently support HDMI 2.0 are the GeForce 900 models. No Radeons have it, not even the R9 Fury cards. I believe it'll be

a feature of the upcoming Rx 400 series, however.

4K computing seems to have eschewed HDMI in favour of DisplayPort. 60Hz has been supported since version 1.2, which was added to GeForce cards with the 600 series. AMD cards have had it even longer, since the HD 6000 series. All 4K monitors offer DisplayPort 1.2. The majority don't yet offer HDMI 2.0.

A downside to all this is that people who want to game on massive 4K TVs are largely out of luck, at least for the time being. TVs tend to use HDMI rather than DisplayPort, and only at version 1.4. It's then 30Hz all the way.

Naturally, not only does your graphics card need to support a suitable output standard (matching an input on your monitor), it needs to be a monster. A good recommendation in these pages for 1080p gaming is the GeForce GTX 750 Ti. But at 4K, a card has to shift four times the number of pixels – four times! Even the most powerful cards on the market can't drive some games at high settings in 4K – SLI or CrossFire is necessary. Have you got deep pockets?

Note – Also worth looking into are FreeSync (AMD) and G-Sync (Nvidia). These are 'adaptive sync' technologies. They allow a monitor to alter its refresh rate up and down to match the output of the GPU, eliminating tearing and other issues. If this is something you're interested in, Shaun, ensure your chosen monitor supports the standard you need.

† At 1080p, 120Hz and 144Hz monitors are now coming to the fore.

▼ If you're trying to make sense of the standards and specs behind 4K/UHD, make sure you've got some headache pills



Crowdfunding Corner

From headphones to speakers, it seems like wireless sound is the next frontier for home technology – and plenty of people are using Kickstarter to prove it. Like the people behind these projects...

RippleBuds

Headphones are a popular category on Kickstarter, and that means you can find a product that fits in almost any niche as long as you're willing to wait for it to come around. RippleBuds are exactly that sort of thing: Bluetooth, wire-free earbuds that include an in-ear microphone and noise-cancelling capabilities. Part headphone, part speakerphone, the RippleBuds are small and discreet and unlike anything else on the commercial market.

Available as single or paired units, the buds have a battery life of five hours each and come with their own battery charging pod, which contains enough power for six full cycles for each unit. Each unit includes five sets of interchangeable rubber bumpers ensure the right fit for your ear. The product has been in development for several years now and this Kickstarter is intended to push them over the final hurdle for production, so there are already lots of background about how well they work from reputable sources.

The cheapest limited tiers have already run out, but the price is still very reasonable. You can get a Mono unit for \$79 (£55) or a stereo unit for \$119 (£85), and the worst you can do is 40% off retail. Mono units will ship in June 2016, and stereo units in September 2016. The project has already hit its target four times over, so it's full steam ahead for this one. If you like the look of them (and we do) then you've got a few weeks left to get on board, but don't hang about!

URL: kck.st/1pvXV05

Funding Ends: Thursday, 21st April 2016

GGMM E3

Most wireless speakers are either over-expensive or under-functional. Cloud playing capabilities seem to come at a particularly high premium. So why not have a look at this project, which aims to produce a multi-functional and yet affordable cloud speaker?

The GGMM E3 speaker works as a stand-alone or smart-connected device, with wi-fi, Bluetooth and AUX connection capabilities. Several can be connected for use as a multi-room speaker, or you can connect two as left/right channels of a normal stereo output. Their compact size allows them to fit comfortably on a bedside table or window shelf, and they even include a built-in clock with alarm capabilities so that they can replace your outdated FM radio alarm.

Compatible services include Pandora, TuneIn, Spotify and Tidal, so there's no danger that you won't be able to use your favourite streaming account with it. An Android and iOS app allows you to play music through your phone or the speakers. It can even charge your hardware through its built-in USB port.

Early bird prices start at \$79 (£55) and there are three colours – white, blue and grey – to choose from. You can also get a Duo package (which has two speakers) for just \$158 (£111). It hasn't yet hit its target, but we're pretty confident that with more than a month to go, it will.

URL: kck.st/1MnPxCS

Funding Ends: Thursday, 5th May 2016



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

CastleStorm – Free to Siege

Protect your territory and send your troops to battle with this addictive tower defence game

Tower defence games are everywhere. They're usually pretty much the same too, apart from the different themes, whether that be zombies shambling toward you, medieval knights approaching or some kind of sci-fi enemy.

All in all, they're a pretty good waste of 15 minutes or so, and they can offer gamers a brief amount of fun. Somehow, though, we've managed to waste an obscene amount of time recently trying to beat *CastleStorm – Free to Siege*.

Defence Of The Realm

CastleStorm differs slightly from the norm, in terms of the tower defence genre. For starters, it allows you greater control over the firing mechanics, and you get to choose from a number of missile types to bombard the approaching enemy with.

Secondly, it gives you the chance to summon various hero types, who you then control for a limited time via an on-screen controller and attack button. And last, but certainly not least, there are different sub games within each of the

main levels, from which you can earn more experience, gold and diamonds to spend in the game shop.

As you'd expect, *CastleStorm* features in-app purchases. To boost your experience, enhance your weapons, increase the amount of damage or to quicken the repair and heal times of your forces and structures, you can opt to pay real-world cash to further your game.

However, you're not limited by the game's inherent freemium qualities. A higher level of skill is required, but you can still advance through the various stages and mini-games without spending a good chunk of your weekly housekeeping on the game.

Ported From The Console

Those of you with consoles will most likely have already heard of *CastleStorm*, since it started life on the Xbox, Steam and PS3. Happily, you'll be pleased to find out that the graphics, gameplay and audio have all been ported relatively successfully, minus one or two elements.

Features At A Glance

- 2D physics destruction.
- Action-strategy-beat-'em up genre mashup.
- Console-quality graphics.
- Full voiceovers and storyline.
- Original soundtrack by Waterflame
- Controls tailored to the touch screen.
- Upgradeable weapons, spells and characters.
- Eight playable hero characters.

Conclusion

While it's not necessarily the greatest game ever conceived and developed, it's certainly very addictive, fun to play, fast paced and reasonably good at distracting you for a good hour, before you realise how much time has actually passed and that you've missed your connecting train.

We rather enjoyed playing *CastleStorm*, and thanks to an ongoing development phase structure, it's continually improving.



▲ *CastleStorm* is an infuriatingly addictive app



▲ You can create your own castle and add all manner of enhancements



▲ You also get to join in with the troops on the ground, while shooting from up on high

Logging Off

The view put forward by many that we live in an 'entitlement era' is one that I'm increasingly supporting as time goes on. It's not just people who expect the world to run in sync with their best interest, though, it's tech companies too. The latest to disperse its dollies is Blackberry, the phone brand competing with Microsoft to control the smallest achievable slice of the massive Smartphone market.

When the body blow news that both Facebook and WhatsApp would no longer be supporting Blackberry 10 came this month, it was clearly a bit too much for it to handle.

"We are extremely disappointed in their decision as we know so many users love these apps", it protested in a blog post, continuing: "We fought back to work with WhatsApp and Facebook to change their minds, but at this time, their decision stands (but let them know how you feel on social media, using the hashtag #ILoveBB10Apps)."

A petition created on ipetitions to support their assertion that 'many users love these apps' has garnered just 1,822 signatures, well short of the modest 10,000 people goal.

Undoubtedly a contributory factor in Facebook's thinking was that an API update broke its BB10 app a few months ago, resulting in a general failure to load new posts. That few people cared enough to complain probably convinced its team to stick a fork in the Blackberry app and declare it 'done'. With that level of interest, what was Blackberry seriously expecting?

It can fervently wave its flag, and continue to pledge its commitment to its developer community, but in the end no other phone maker has any vested interest in the continued existence of the BB10 platform. The stark reality is that, based on currently available numbers, Blackberry accounts for just 0.2% of worldwide Smartphone sales – making the pitiful 1.1% that Microsoft cherishes seem copious.

Apple and the Android devices represent 98.4% of the market, and that's where Facebook and WhatsApp developer resources go. Neither of those operations is a charity, after all.



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That BB10 got the support it once did is probably only a historical quirk, and even chirpy Blog postings from Blackberry's senior people aren't likely to convince software developers that the world is wholly different than how most of them view it. The upset that Blackberry is experiencing now isn't anything new, and ecosystems rise and fall all the time. That is why people aren't writing Windows 16-bit apps these days, or releasing new titles for the Oric Atmos, if you wondered.

Some tech has its moment, while some goes directly to obscurity without passing Go. Microsoft, may soon start to feel the same rip tide as Blackberry... I wonder how long it will be before its blog includes a whine aimed at developers leaving to earn a living instead of supporting the Windows OS indirectly?

All operating systems rely on the goodwill of developers these days, and when that's gone it normally won't come back, however much companies whine.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Concatenation, 8 Smooth, 9 Upcase, 10 Cyclone, 12 Bylaw, 14 Macro, 16 Payload, 19 Insure, 20 Caveat, 22 Inverted Comma.

Down: 1 Boom, 2 Scroll, 3 Etching, 4 Uncut, 5 Sticky, 6 Botswana, 11 Yearning, 13 Bar Code, 15 Router, 17 Live OS, 18 SEXTS, 21 Acme.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Aside from considering a potential name change to #MartyMcMicroface it's been a fairly quiet week around these parts. I guess everyone being heads down for the long Easter weekend has had something to do with it. That and

the sugar comas we've all been gently slipping in and out of due to a few too many seasonal treats. Oh, the coffee machine's broken, though, which is as close to a genuine emergency situation as any of us here has had to deal with in a long, long time. Now we're faced with the modern dilemma of deciding whether we would like to continue with the old fashioned routine of measuring out, tamping and drooling as coffee drips slowly into our cup, or going for one of those fancy pod things and handing all of it over to modern technology. If you know us well enough, you can probably guess what we're going to do... Stick with what we know, of course.

THIS WEEK'S CROSSWORD

Across

7 A person who breaks into a computer network in order to test or evaluate its security, rather than with malicious or criminal intent. (7,6)

8 An inorganic coordination compound of ammonia and a metallic salt. (6)

9 Ren (DOS) (6)

10 A brand used for a series of x86-compatible microprocessors produced by Intel since 1993. (7)

12 The world's most popular open source database. (5)

14 In statistics a general specification test for the linear regression model. (5)

16 He discovered electromagnetic induction. (7)

19 Two photographs taken from slightly different angles that appear three-dimensional when viewed together. (6)

20 In card games the suit that has been declared to rank above all other suits for the duration of the hand. (6)

22 The designers and engineers at NASA and Roscosmos seem to understand all this stuff. (6,7)

Down

1 The smallest constituent unit of ordinary matter that has the properties of a chemical element. (4)

2 Intelligence information gathered from communications intelligence or electronics intelligence or telemetry intelligence. (6)

3 Supergiant star 650 light years from Earth; second brightest star in the sky. (7)

4 A file storage area that is available over a computer network. (5)

5 Small or insufficient in quantity or amount. (6)

6 Pokemon group wishing to expand the seas by awakening Kyogre. (4,4)

11 A formal and organized choice by vote of a person for a political office or other position. (8)

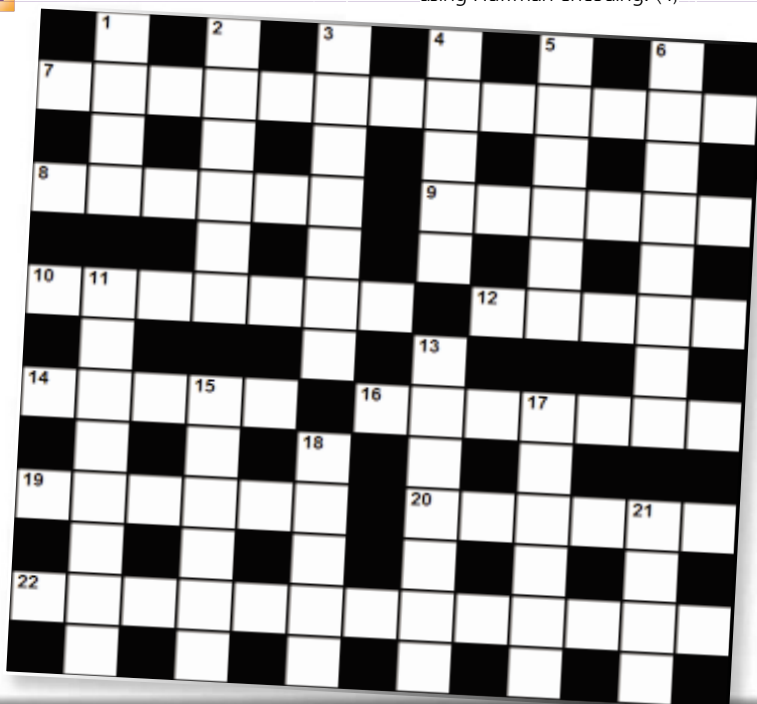
13 A regular geometric arrangement of points or objects such as the atoms in a crystal. (7)

15 The state motto of California. (6)

17 The ability to make good judgements and take quick decisions. (6)

18 Chuck Moore's imperative stack-based computer programming language and programming environment. (5)

21 A UNIX utility to compress files using Huffman encoding. (4)



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